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US Army Information Systems Engineering Command
Fort Huachuca, AZ 85613-5300

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U.S. ARMY INSTITUTE FOR RESEARCH
IN MANAGEMENT INFORMATION,
COMMUNICATIONS, AND COMPUTER SCIENCES
(AIRMICS)

INTEGRATED IMA IC GUIDE

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AIRMICS
115 O'Keefe Building
Georgia Institute of Technology
Atlanta, GA 30332-0800

U. S. ARMY INSTITUTE FOR RESEARCH IN MANAGEMENT INFORMATION, COMMUNICATIONS, AND COMPUTER SCIENCES (AIRMICS)

INTEGRATED IMA IC GUIDE

The views, opinion, and/or findings contained in this guide are those of the authors and should not be construed as an official Department of the Army position, policy, or decision unless so designated by other documentation.

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CHAPTER 1
INTRODUCTION

The introductory chapter to the Integrated IMA IC Guide defines the guide's scope, perspective, objectives, and applicability. The organization of the guide is also described as is the use of specified terms.

1.1 SCOPE

This guide addresses the integration of end-user support for the Army's five Information Mission Areas (IMAs) into the Information Center (IC). Army Regulation 25-1, The Army Information Resources Management Program (18 November 88) defines the IMA disciplines as automation, telecommunications, visual information, records management, and publications and printing. Although library management is also an information service, library management is not generally defined as an IMA discipline. Therefore library management is not addressed in this guide.

1.2 PERSPECTIVE

This guide is based on the current research with respect to ICs for the U.S. Army conducted by the Army Institute for Research in Management Information, Communications, and Computer Sciences (AIRMICS). AIRMICS is the research arm of the U.S. Army Information Systems Engineering Command (ISEC).

The guide includes three perspectives on the integration of support for the IMA disciplines in the IC. The first perspective is provided by current Army regulations and pamphlets. These

directives describe the Army's policy on information management and the IMA disciplines. Second, DOIMs and IC managers provided their perspective on how support for the IMA disciplines can be integrated into the IC. A list of the ten organizations who contributed their experience to this guide is found in Table 1-1. Finally, this guide reflects the perspective developed by the researchers as they applied Army policy and field experience to the concept of the integrated IMA IC.

Table 1-1
Organizations/Installations Consulted

Headquarters, Forces Command (FORSCOM)
Fort McPherson, Georgia

Headquarters, Information Systems Command (ISC)
Fort Huachuca, Arizona

Headquarters, Seventh Signal Command,
Fort Ritchie, Maryland

Army Signal Center,
Fort Gordon, Georgia

Headquarters, Army Materiel Command (AMC),
Alexandria, Virginia

Office of the Director of Information Systems for
Command, Control, Communications, and Computers
(DISC4), Pentagon

(Army) Washington Area
Information Center Working Group

Fort Benjamin Harrison,
Indianapolis, Indiana

Headquarters, Army Training and Doctrine Command
(TRADOC) Fort Monroe, Virginia

Fort Belvoir, Virginia

1.3 OBJECTIVE

The overall objective of the Integrated IMA IC Guide is to provide DOIMS and IC Managers with strategies which will facilitate their efforts to provide integrated end-user support in the IC for the IMA disciplines. Each chapter in the guide has a specific objective:

- To summarize the IMA concept and its relationship to the IC (Chapter 2);
- To provide an overview of the impact of new information technology on the organization and the IC (Chapter 3);
- To provide alternatives for how the IMA disciplines can be integrated into the IC (Chapter 4);
- To provide suggestions for how to implement the integrated IMA IC (Chapter 5); and
- To provide an overview of each IMA discipline and specific strategies for integrating each discipline into the IC (Chapters 6 -10).

1.4 APPLICABILITY

The Integrated IMA IC Guide provides guidance to all installations who are planning, implementing, or operating an IC which supports one or more IMA disciplines.

1.5 COMPANION GUIDE

The Integrated IMA IC Guide is a companion guide to the Information Center Planning and Implementation Guide which was released in January 1987. Both the Integrated IMA IC Guide and

the Information Center Planning and Implementation Guide are available through Headquarters, U.S. Army Information Systems Command, Deputy Chief of Staff for Plans. The Information Center Planning and Implementation Guide is also the result of AIRMICS' research.

1.6 ORGANIZATION OF THE GUIDE

The chapters in the guide are divided into three groups. The first group, Chapters 1 - 3, provide the context for the integration alternatives. Chapters 4 - 5, the second group, are the heart of the guide and focus on the integrated IMA IC. Specific integration alternatives are presented in the fourth chapter. Implementing the integrated IMA IC is the topic of the fifth chapter. The third group of chapters, Chapters 6 - 10, discuss each IMA discipline, and how support for that discipline can be integrated into the IC.

Because each chapter of the guide builds on the information presented in the previous chapter, the guide is designed to be read sequentially. However, readers who are familiar with information technology and the concepts of information management may wish to focus on Chapters 4 - 5. Readers who are interested in a specific IMA discipline will find a chapter devoted to each discipline.

The guide concludes with a bibliography found in the appendix. The bibliography includes resources on Information Centers and end-user computing, information management, and each

of the IMA disciplines. A list of applicable documents from the Department of the Army (DA), the Department of Defense (DoD), and other government sources is also given in the appendix.

1.7 USE OF TERMS

To identify and properly attribute various products, trade names and manufacturers' names are occasionally used in this guide. Such identification does not imply recommendation or endorsement by the U.S. Army, nor does it imply that the products identified are necessarily the best available for the purpose.

Throughout this guide the pronoun "he" means "he" or "she."

CHAPTER 2
BACKGROUND

This chapter of the guide presents an overview of the Information Mission Area (IMA) concept as defined in AR 25-1 and its impact on the Information Center.

2.1 IMA OVERVIEW

The Army's IMA concept is an outgrowth of the government-wide implementation of information resources management (IRM), as required by the Paperwork Reduction Act of 1980 and the Paperwork Reduction and Reauthorizaton Act of 1986.

2.1.1 THE NEED FOR INFORMATION MANAGEMENT

Several prevailing conditions in the workplace pointed to the need for a new way to manage organizational data/information:

- Increased demand for information;
- Need to access data from throughout the organization;
- Need to coordinate information from several sources;
- Existence of redundant data bases; and
- Convergence of information technologies.

The demand for information by decision-makers at every level of the organization has never been higher. To meet this demand today's technology can generate, process, transfer, and store information in quantities never before imagined. As a result the decision-maker may be inundated with information from a variety of sources, as shown in Figure 2-1. However, this information may be untimely, inappropriate, contradictory, or difficult to

SOURCES OF INFORMATION

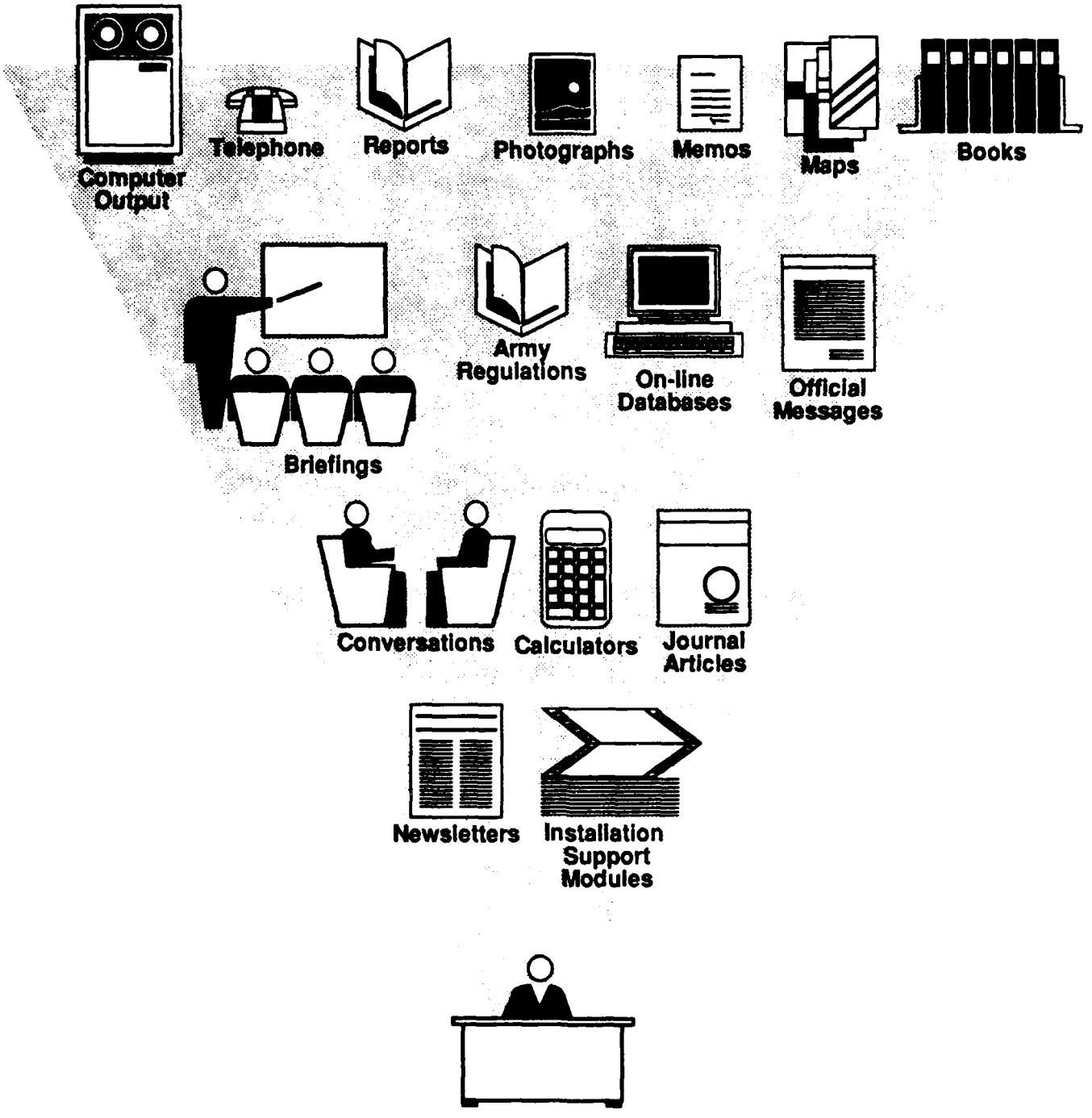

Figure 2-1

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comprehend. In short, often the information received is of no value in the decision making process. In this example, the problem is not solved with more or improved technology but rather with information management. Simply put, the goal of information management is to get the right information to the right person at the right time.

2.1.2 THE PAPERWORK REDUCTION ACT

The Commission on Federal Paperwork was established in 1974 to address the need for information management. The commission sought to determine what changes should be made to the government's information policies and practices to reduce the paperwork burden. The use of the term "paperwork" reflected the fact paper was the primary means of collecting and distributing information in organizations. Since computers are responsible for an increasing percentage of information processing, the term "paperwork" was replaced with the term "information" by the Commission.

The Commission further expanded the concept of information management to include the idea that information is a resource which should be managed as any other organizational resource, thus the term "information resources management," or IRM. As put forth by the Paperwork Reduction Act, there are two tenets of the IRM strategy: information resources management should entail the management of the total information life cycle from collection to

dissemination; and information is an economic resource and should be managed as other economic resources are managed.

Under the Paperwork Reduction Act, IRM became mandatory for all government agencies. This law is implemented in the Army through the Army Information Resources Management Program and the IMA.

2.1.3 THE IRM CONCEPT

The concept of federal IRM was a direct result of the Paperwork Reduction Act of 1980. As shown in Figure 2-2, IRM has three inter-related components. First, IRM includes all manual and automated organizational data/information regardless of the medium on which it is recorded. The second component of IRM includes the methods which are used to generate, process, store, retrieve, transmit, and present organizational data/information. Third, IRM includes the policies and procedures used to manage organizational data/information.

In the past solutions to information needs have focused on only a subset of these components: the actual data/information and the associated processing methodologies. Information problems were solved with technological solutions such as improved information processing hardware or the development of a new application.

The introduction of the IRM concept added the integrative management aspect. That is, all information resources, no matter where located in the organization or how stored, are managed to

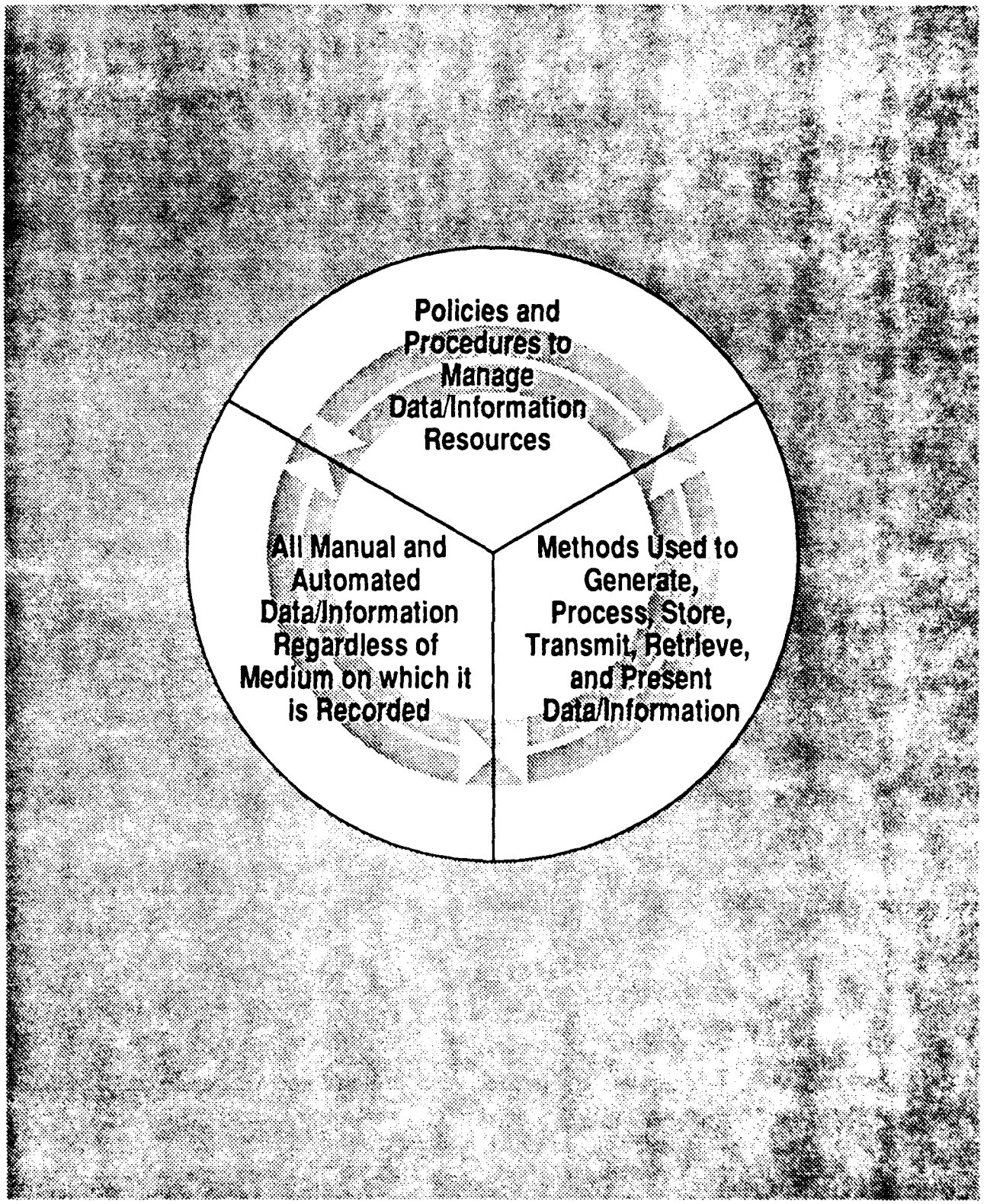

Figure 2-2

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ensure effective utilization. IRM focuses not on the management of information technologies, but on the management of information.

To summarize the IRM concept, the following definition is provided as found in the AR 25-1 glossary, IRM includes:

> The planning, budgeting, organizing, directing, training, promoting, controlling and management activities associated with the burden, collection, creation, maintenance, utilization, dissemination, and disposition of information regardless of media, and includes the management of information and information related resources and systems, whether manual or automated, such as records management, agency sharing and dissemination of information, an acquisition and use of automatic data processing, telecommunications, and other information technology.

2.1.4 THE ARMY INFORMATION RESOURCES MANAGEMENT PROGRAM

The Army Information Resources Management Program (AIRMP) is the Army's implementation of the IRM concept. As summarized in AR 25-1, the AIRMP is designed to ensure that "appropriate, timely, and accurate information is identified, directed, communicated, stored, resourced, and made available for the execution of Army responsibilities." Under this concept, information is viewed as an organizational resource, not a resource which belongs to a specific area. All information, regardless of functional proponecy, is a shared resource which must be readily accessible to those with the "need to know."

The AIRMP uses three inter-related management tools, described in AR 25-1, to ensure that information requirements are

satisfied in a way which fulfills the AIRMP's charter to encourage the sharing of information, reduce data redundancy, and promote interoperability of information systems. The first tool is the Information Requirements Study (IRS). The IRS is a formal study of the installation which documents the information needed by the organization to meet its mission. It includes a description of manual and automation information systems. The result of the IRS is an information model for the organization, depicting the flow of information among management areas.

A second management tool of the AIRMP is the installation's information architecture. Individual information architectures (IAs) are incorporated in the Army's Information Architecture (AIA). Installation information architectures are built upon the IRS and the resulting information model. The installation's IA includes a baseline configuration, a current target configuration, an objective configuration, and a plan. The baseline configuration identifies the current information resources, both automated and manual. The current target configuration includes those new information resources which are under development and /or procurement, but are not yet available in the baseline configuration. The objective configuration defines the information resources needed to support the information needs of the organization; it is not restricted by resource availability. These configurations are dynamic. As new information resources are made available, they are added to the baseline configuration and removed from the current target configuration. New developments in information technology may be added to the objective config-

uration. The final element of the installation's IA, the plan, describes how the organization will achieve its objective configuration.

The Information Management Plan (IMP) is the third management tool used under the AIRMP to ensure information requirements are met. Initiatives described in the IMP should be consistent with the IRS and the installation information architecture. Users identify and document their information needs via a capability request (CAPR). Those information needs which cannot be met locally with current resources may be submitted as an IMP initiative. Installation IMPs are combined in the Information Management Master Plan (IMMP). The IMMP contains prioritized descriptions of initiatives which have been approved for implementation. The IMMP does not contain funding approval.

2.1.5 THE INFORMATION MISSION AREA CONCEPT

While the AIRMP focuses on the management issues of information management, the Information Mission Area (IMA) concept focuses on the integration of the different information-related disciplines to meet the Army's information needs. The term "IMA" is often used to refer to all information management within the Army, including the AIRMP.

The IMA is defined in the AR 25-1 glossary as:

> The resource requirements and associated information management activities employed in the development, use, integration, and management of information. The IMA includes all resources and activities employed in the acquisition, development, collection, process-

> ing, integration, transmission, dissemination, distribution, use, retention, retrieval, maintenance, access, disposal, and management of information. Information resources include doctrine, policy, data, equipment, and applications and related personnel, services, facilities, and organizations. The IMA includes all three of the Army's environments: Theater /Tactical, Strategic, and Sustaining Base.

Note that the definition of IRM found on page 2-6 is almost parallel to the definition of the IMA found above. Both IRM and the IMA are concerned with the management of information and information-related resources from acquisition or creation to disposal or disposition.

The IMA concept was developed in 1984 as part of the Army's response to the federal requirement for information resources management. As originally established the IMA includes the five disciplines of automation, telecommunications, visual information, records management, and publications and printing. Although libraries are an information service, library management was not included in the original definition of the IMA disciplines. Joining together each of the individual IMA disciplines creates the IMA, as illustrated in Figure 2-3.

Because of their information orientation, the IMA integrates discipline areas which previously operated as separate entities. The converging of information technologies, as described in Section 3.1.3, also provides a link between the IMA disciplines. The IMA seeks to supplement the support currently offered by the discipline areas with coordinated services and integrated planning.

THE FIVE DISCIPLINES OF THE IMA

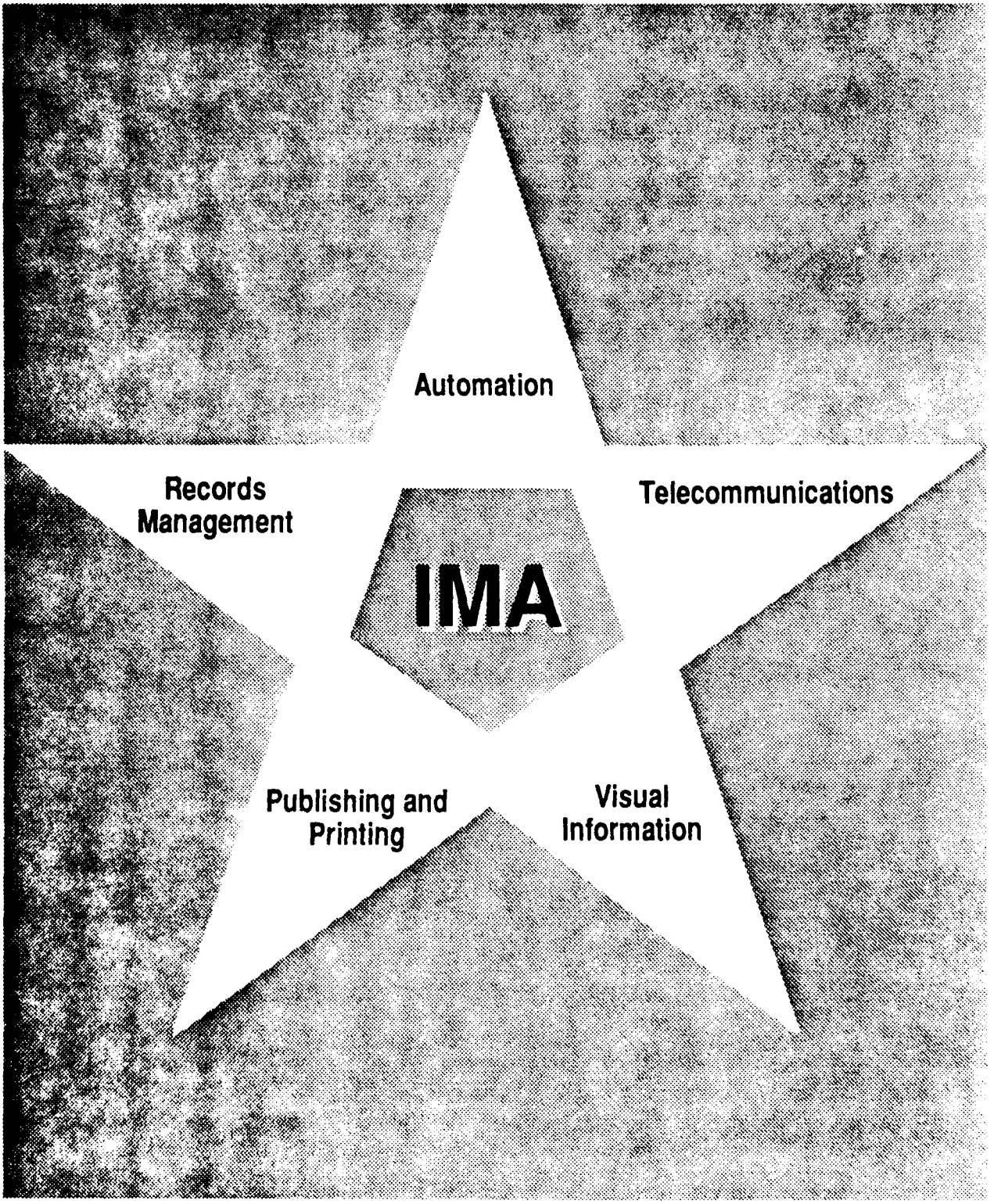

Figure 2-3

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Combining the discipline areas in the IMA provides benefits to management, the end-users community, and discipline area staff. In addition to improved information management and planning, management gains from more efficient use of personnel. End-users benefit from coordinated information services. Personnel from the individual disciplines have expanded opportunities for professional development through interaction with other discipline areas, and additional career paths within the IMA.

2.1.6 THE DIRECTOR OF INFORMATION MANAGEMENT

As described in AR 25-1, each installation will have a Director of Information Management (DOIM). It is the responsibility of the DOIM to implement the installation's information resources management program including maintaining the installation information architecture, identifying and validating user information requirements (CAPRs), and determining how to best meet information requirements, submitting an IMP if necessary. In addition the DOIM is responsible for the management and supervision of the information management staff, providing information services to users, and the operational activities of the IMA. The standard DOIM organization is defined in AR 5-3, the Standard Installation Organization.

Under the DOIM the IMA disciplines are combined to provide multidisciplinary support. The IMAs are combined to achieve greater efficiency and effectiveness in meeting the organization's information needs and to avoid duplication of

effort. The DOIM's responsibilities for the IMA disciplines include, but are not limited to:

- Automation: assigned data/information processing facilities;
- Telecommunications: telecommunications centers and leased commercial and Army telecommunications systems;
- Visual Information: assigned visual information activities;
- Records Management: the records management life cycle; and
- Publications and Printing: Army publications, printing, and forms programs.

In addition the DOIM is responsible for specified library services, resources, and facilities.

The IC is one of the standard activities under the DOIM, in accordance with AR 5-3, and "will serve as a central point of contact for user inquiries on all matters pertaining to information management."

2.2 IC AND THE IMA

This section provides a summary of the IC concept and the IC's role in supporting the IMA. The IC concept is discussed in greater detail in the Information Center Implementation and Planning Guide.

2.2.1 THE IC CONCEPT

The IC is a multidisciplinary information, consulting, and educational support service. The IC provides the end-user with the tools and techniques he needs to become self-sufficient and productive in the use of information technology as required to retrieve, analyze, manipulate, and present his data/information. An end-user is an individual who has direct, hands-on interaction with information technology and who decides how to use that technology to meet his information needs. The end-user's goal for using information technology is not necessarily to acquire technical skills, but to be able to use the technology as a tool to accomplish his work more efficiently and with greater control of the result. Information technology includes all equipment, hardware, and software used to create, process, store, reproduce, and present information (see also Chapter 3). The IC also assists the end-user in recognizing and specifying his information technology acquisition needs.

2.2.2 AN IC AT EACH INSTALLATION

In September 1985 the U.S. Army Information Systems Command (USAISC or abbreviated, ISC) directed all installation DOIMs to establish an IC. The ISC directive to establish ICs occurred at the same time that use of microcomputers was rapidly expanding in the Army. As a result, ISC directed that the initial focus of the IC was to provide support to users of microcomputers.

Previous to ISC's directive to establish ICs in the Army, the Information Center concept had already been implemented at many sites in industry, government, and the Army. Most of these early ICs were designed to support users of computer technology. In addition to providing micro, mini, and mainframe support many of these ICs provided communications assistance as well.

2.2.3 THE INTEGRATED IMA IC

While the initial mission given to Army ICs was to support automation, subsequent guidance made it clear that eventually ICs would support all of the IMA disciplines. Because support for all of the IMA disciplines will be integrated into the IC, the expanded IC is referred to as the "integrated IMA IC" in this guide. It is the role of integrated IMA IC to provide integrated support to facilitate the end-user's use of information technology to satisfy his information needs. Specific integration alternatives are described in Chapter 4 of this guide.

In the integrated IMA IC end-user support is added to the IC's services for all of the IMA disciplines which have transitioned to the DOIM. However, the integrated IMA IC is more than just a realignment of end-user support from one place in the organization to another. Inherent in the IMA concept is the idea that the IMA disciplines are no longer independent organizations. Information and information technology are not the property of one organizational element, but are shared organizational resources. Indeed, all of the IMA disciplines share a common

objective: to assist individuals to efficiently and effectively use information to fulfill their job responsibilities. In addition, given the overlapping of information technologies, fulfilling the user's information need will probably require an approach which integrates the information technology of several IMA disciplines. The integrated IMA IC provides the user with assistance which integrates the appropriate information resources of the organization to meet the user's need.

2.2.4 THE INTEGRATED IMA IC FROM THE USER'S PERSPECTIVE

The end-user may be unaware of the how IMA discipline areas are defined and unable to determine if his information need is a telecommunications problem or a records management issue, or both. He does know, however, that he has a need. Under the integrated IMA IC concept the user has a single place, the IC, to contact for support of all of his information needs. As shown in Figure 2-4, the IC is the end-user's point of access to all of USAISC's resources. In addition to the IMA discipline areas, users have access through the IC to the technical support available from the General Purpose Computer Support Center and the Computer Engineering Center (see Section 5.2.2.1).

Figure 2-5 summarizes the flow of information needs and policies in the installation. The user identifies his information requirements and needs with the assistance of the integrated IMA IC. Some needs can be met by the IC; others will require a CAPR or IMP initiative. Regardless of whether it has been

END-USER ACCESS TO ISC RESOURCES

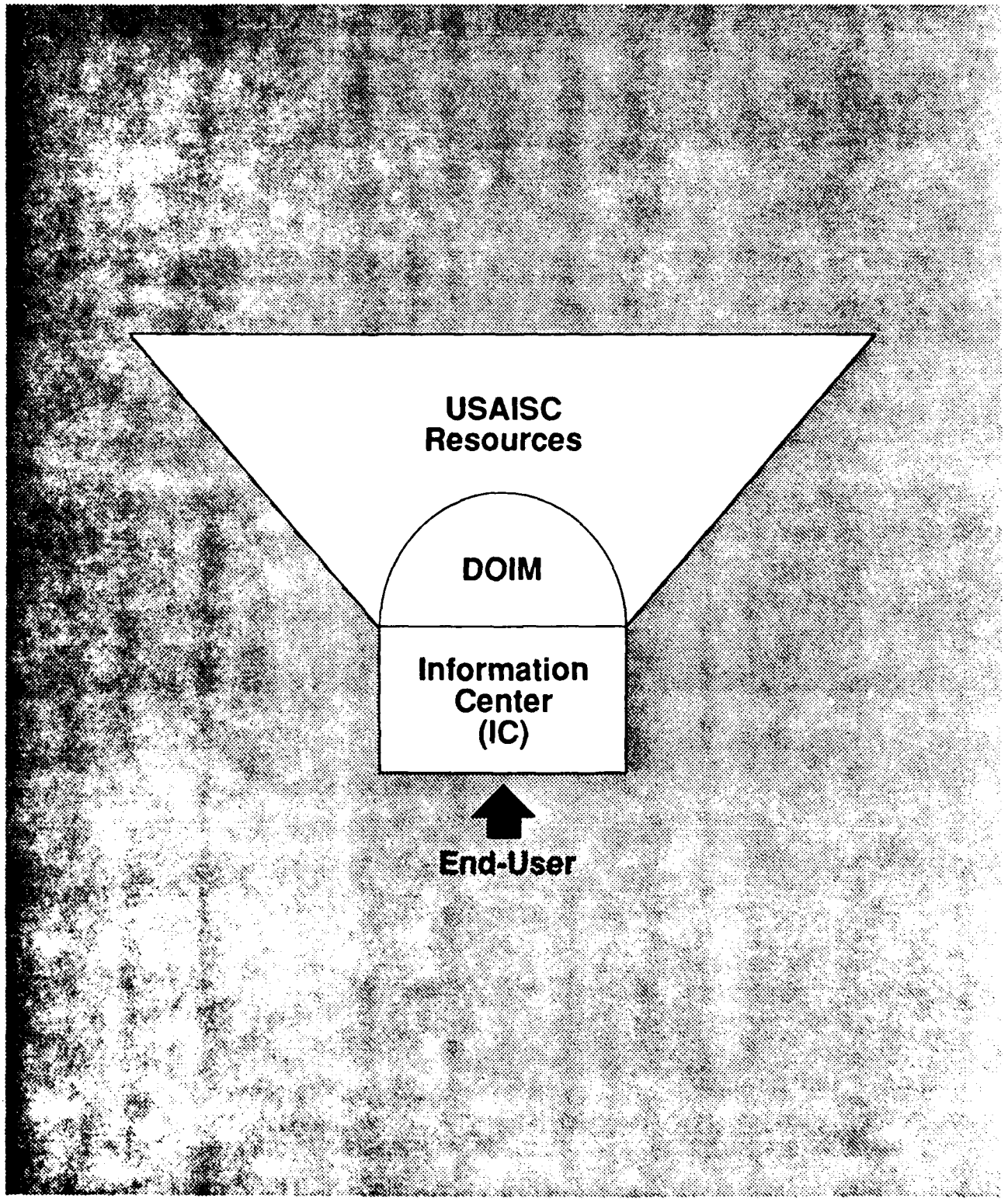

Figure 2-4

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FLOW OF INFORMATION NEEDS AND POLICIES

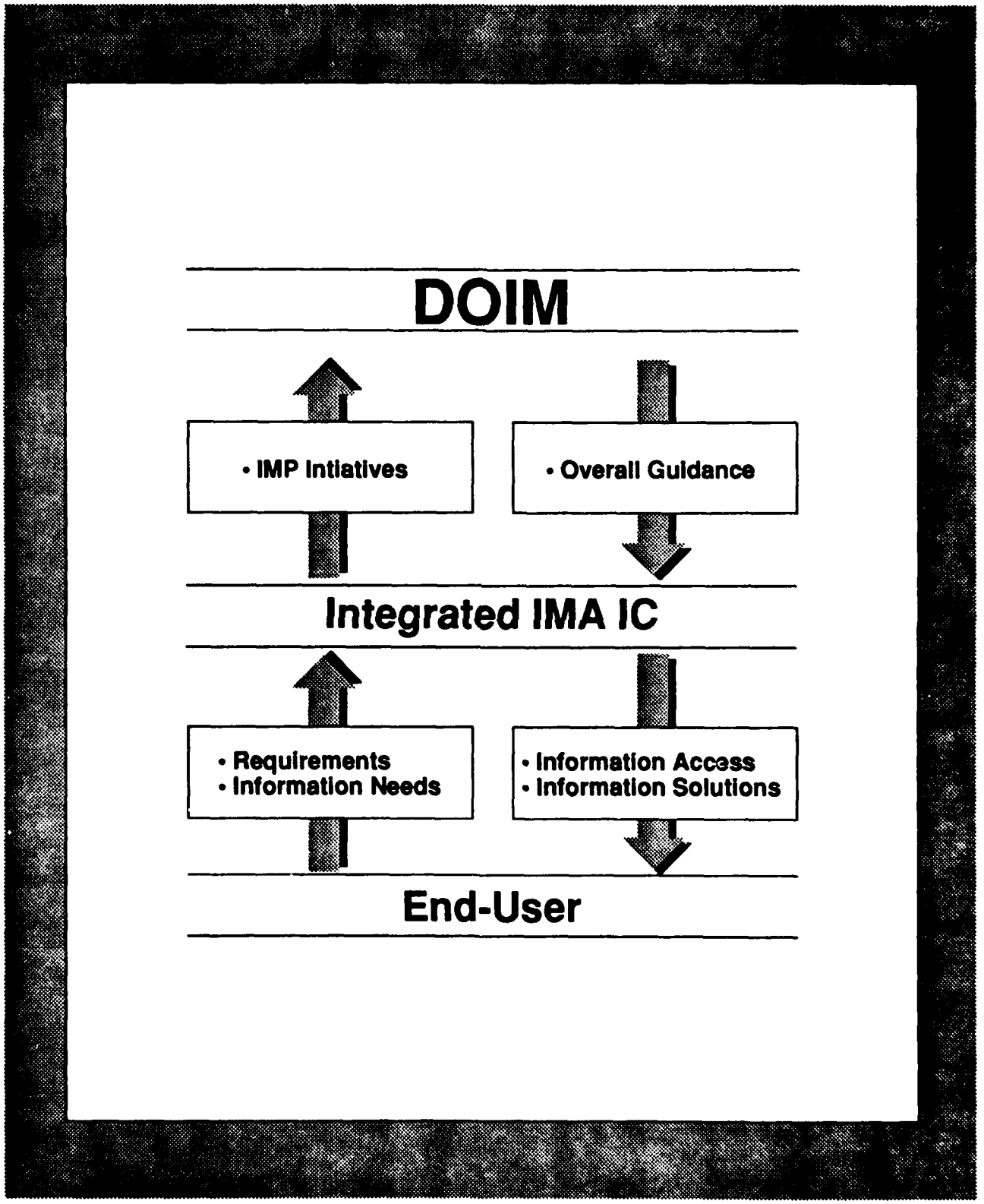

Figure 2-5

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officially tasked to do so, the IC may assist the user in preparing the CAPR or IMP. These needs are then forwarded to the DOIM for evaluation with respect to the installation's information resources management program. As the individual responsible for maintaining the installation's information resources management program, the DOIM provides guidance to the integrated IMA IC on how to meet users' needs with IMA resources. The integrated IMA IC then provides the information access and information solutions required by the user.

CHAPTER 3
INTEGRATION OF INFORMATION TECHNOLOGIES

The immediate challenge of the Army IC today is to incorporate support for the IMA disciplines into the IC. However, because the role of the IC is to enable end-users to use information technology effectively, ICs must also be concerned with new developments in information technology. Additionally, new information technology is important to the IC because in some installations the IC is responsible for evaluating and introducing new technology into the organization.

This chapter focuses on the infusion of new information technology into the organization. Because indications are that this influx is on-going and inevitable, organizations need to develop an approach for responding to new information technology. This chapter begins with an overview of information technology trends. Next, a model for the introduction of new information technology into the organization is presented. Finally, the Information Center's role in integrating information technology into the organization is discussed.

3.1 INFORMATION TECHNOLOGY TRENDS

Information technology is defined in the Dictionary of Computing and Information Technology as "The acquisition, processing, storage, and dissemination of vocal, pictorial, textual, and numerical information by means of computers and telecommunications." Information technology includes all equipment/hardware and software which is used to create, process,

store, reproduce, and present information. Today information technology is rapidly changing; new information technologies are emerging and existing information technologies are developing in new directions.

This section describes three trends in information technology: developments in information technology, the increasing availability of information technology to the end-user, and the convergence of information technologies. Each of these trends will impact the services offered by the IC. This section concludes with a description of a hypothetical office of the future.

3.1.1 INPUT, OUTPUT, AND TRANSMISSION DEVICES

One trends in information technology is the development of alternative devices to record, store, and send information. Specific developments in information technology for each of the IMA disciplines are discussed in Chapters 6 - 10. The sections of the guide which describe in greater detail some of the technologies mentioned in the discussion below are indicated in parentheses.

Today the standard computer input device is a keyboard. In addition, data can be input via such mechanisms as voice (Section 6.3.7), touch screens, optical character recognition (Section 9.3.2), and digital information transfer (Section 6.3.7). Current technology developments are also focusing on efficient storage devices, such as optical disks (Section 9.3.1). New means to improve the quality and increase the speed of data

transmission are also under development. The impact of this trend on the IC is that the IC will need to provide end-user support for these information technologies as they become commonly available.

3.1.2 INCREASED AVAILABILITY OF TECHNOLOGY TO THE END-USER

The combination of increased power and decreased cost has resulted in the increased availability of information technology to the end-user. For example, today's microcomputers are more powerful than yesterday's minicomputers. Once activities such as computers, publishing, and graphics were the domain of discipline experts. Now nearly every worker has technological access to these capabilities, although often he lacks subject matter expertise of the discipline expert. The role of the IC then is to help the user gain access to the discipline expertise as required to use this technology successfully.

3.1.3 CONVERGENCE OF TECHNOLOGIES

The convergence of information technologies points to the need to integrate the IMA disciplines and to provide integrated support in the IC. As technological developments from one discipline are applied to devices created for a different information discipline area, the distinction between the discipline areas is obscured. For example, the office copier is an information technology device which originally functioned as a labor-saving machine, replacing carbon paper for records managers. Today, the copier could also be classified as a

printing or computing device because of the quality and speed of the output and the automation technology (Section 10.3.2) used in the equipment.

Another example of the application of information technology to an IMA discipline is electronic publishing. Electronic publishing has replaced the "cut and paste" layout technique of the past. Desktop publishing (Section 10.3.1) performed on a microcomputer is the end-user's equivalent to electronic publishing. The application of automation to publications and printing and the availability of this technology to the end-user raises the issue of support. Should end-user support be provided by the publications and printing shop because they are the subject matter experts or by the IC because they are the end-user experts? One solution is the integrated IMA IC.

The information technologies of communications and automation are the technologies which are most often applied to the discipline areas. Table 3-1 illustrates the overlap of the IMA disciplines. The application of automation technology to publishing and printing, records management, and visual information is shown in the upper portion of the table. The use of communications technology in visual information is shown in the lower portion of the table. The center, shaded section of the table illustrates the integration of automation and telecommunications, and the application of these technologies to the other IMA discipline areas. As communication and computer technology is incorporated into records management, visual information and publishing and printing devices, the distinctions

OVERLAP OF THE IMA DISCIPLINES

	Publishing and Printing	Records Management	Visual Information	Telecommunications
AUTOMATION	Desktop Publishing Electronic Publishing Image Scanners Optical Disk Storage Forms Generation Software Intelligent Copiers	Computer Assisted Retrieval (CAR) Computer Output Micrographics (COM) Image Scanners Copiers Optical Disk Storage	Computer Assisted Design (CAD) Computer Generated Graphics LCD Units Graphics Output Devices	
Automation & Telecommunications	Work Group Publishing	Electronic Records Management Image Based Systems	Video Data Bases Electronic Meeting Rooms	Automated Message Switching Computer Teleconferencing Electronic Data Interchange (EDI) Electronic Mail Voice Technology
TELECOMMUNICATIONS			Facsimile Transmission LANs Video Conferencing	

Table 3-1

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between the discipline areas is becoming blurred. The IMA disciplines, which have been managed independently, are becoming interdependent.

3.1.4 OFFICE OF THE FUTURE

The integration of information technology in the workplace will result in profound changes in the way most personnel perform their jobs. It has been predicted that in the office of the future clerical personnel will become technical specialists. Knowledge workers will retrieve and analyze data and information with the tools of information technology. Managers will base their decisions on information received electronically. The focus of the individual's job will not change. For example, a contracting officer will still negotiate contracts. However, the tools used to accomplish the task will change. Figure 3-1 illustrates some of the functions which might be available on the workstation in the office of the future.

A potential scenario in the office of the future is described below. Joe turns on his microcomputer when he first arrives at work on Monday morning. In his electronic mail box he finds a message from his boss asking Joe to prepare a briefing that the boss will present during a video teleconference the next week. Joe is unclear about some of the existing policy relating to the topic of the briefing, so using his computer Joe accesses an index of all Army Regulations (ARs). The index and associated ARs are stored on a single optical disk. When he finds an AR he needs, Joe selects it using his computer. Because Joe has a hard

WORKSTATION OF THE FUTURE

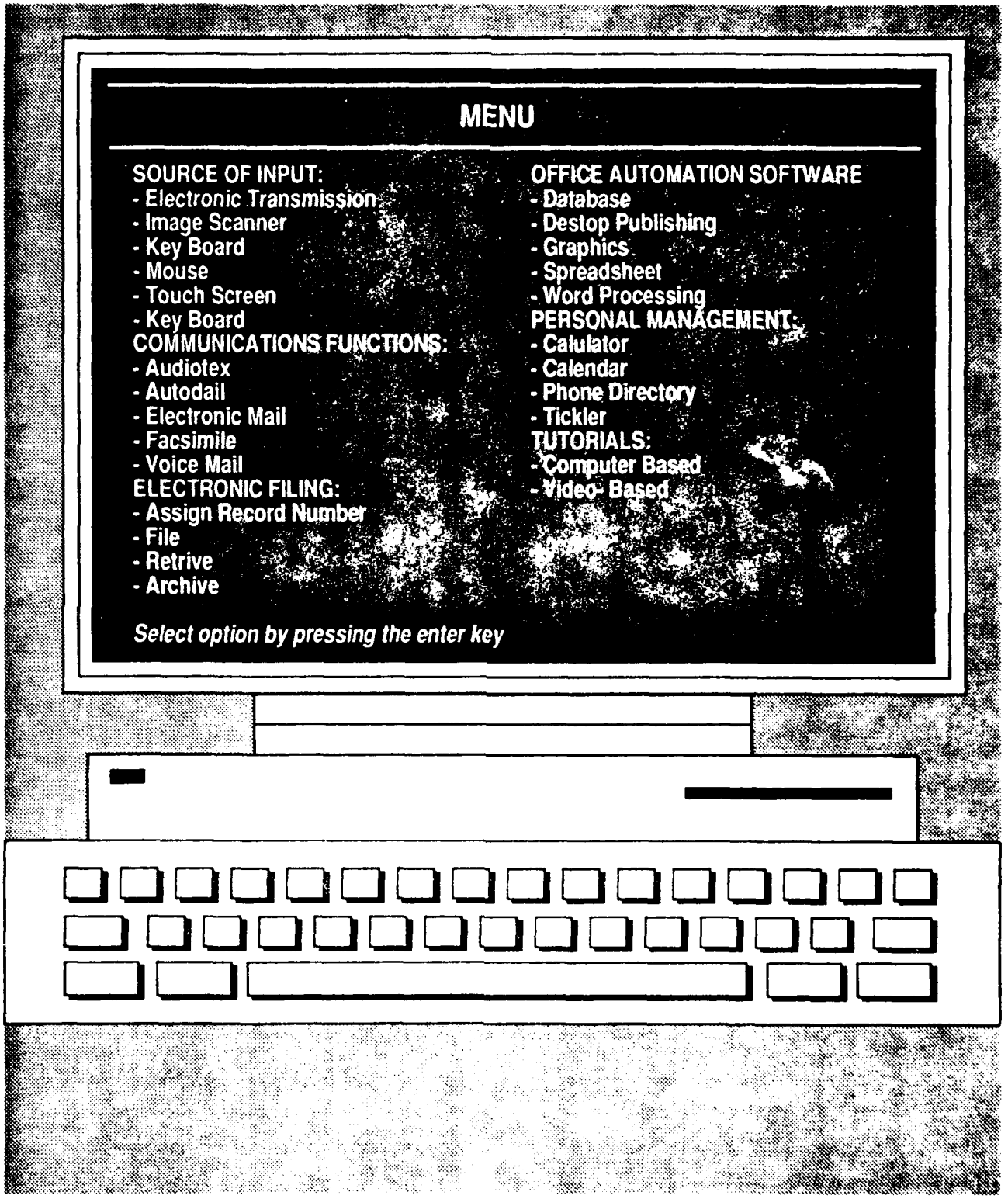

Figure 3-1

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time reading long documents on-line, he wants a hard copy of the AR. Joe asks that it be sent electronically to the laser printer attached to his work group's local area network (LAN).

Joe starts to prepare the visuals for the briefing using a presentation graphics software package. Because it has been six months since he last used the software, Joe has forgotten some of the commands, and he cannot locate his manual. Joe then dials through his computer into the Information Center's expert system for assistance. Once his problem is solved, Joe finishes the visuals. Since this is a high-level briefing, Joe wants the visuals to really look sharp. Joe then sends the visuals electronically to the visual information shop for the finishing touches. When Joe gets the visuals back, he is ready to show them to his boss. Since his boss is always in meetings, Joe leaves the boss a message using the voice messaging system, telling the boss that the visuals have been sent electronically to the boss's computer for review.

While Joe has been working on the briefing, the boss had a new idea for one of the visuals. The boss sketched out the idea on a pad of paper during one of his meetings. When the boss went back to his office, the boss used the image scanner attached to his computer to input the image. Then the boss forwarded the image electronically to Joe for inclusion in the briefing. Joe then revises and finalizes the visuals.

The video teleconference is a success. Joe's boss is asked as an action item to prepare a new regulation on the same topic.

The boss leaves Joe another electronic mail message, this time asking Joe to draft the new regulation. Using desktop publishing software, Joe drafts the regulation. Joe incorporates many of the visuals from the briefing into the text.

The draft regulation is staffed electronically. After all of the comments are incorporated, and the document is approved, Joe transmits the regulation electronically to the print plant for printing. The regulation will also be available on optical disk.

3.2 INTRODUCTION OF NEW TECHNOLOGY INTO THE ORGANIZATION

The introduction of new, more powerful, user-oriented information technology in the workplace makes it critical for organizations to actively manage information (see Section 2.1) and the technology used to manipulate this information.

The model described below presents the alternative courses of action which are available to organizations as they evaluate new information technology. The model demonstrates that organizations have the opportunity to control the integration of constantly evolving technology into the organization. This model was developed during the course of the same research project that resulted in this guide. The model includes an introductory phase, one or more integration phases, and an institutionalization phase. The characteristic users, impetus, and organizational attitude of each phase are described. The model is illustrated in Figure 3-2, and summarized in Table 3-2.

INTEGRATION OF NEW TECHNOLOGY INTO THE ORGANIZATION

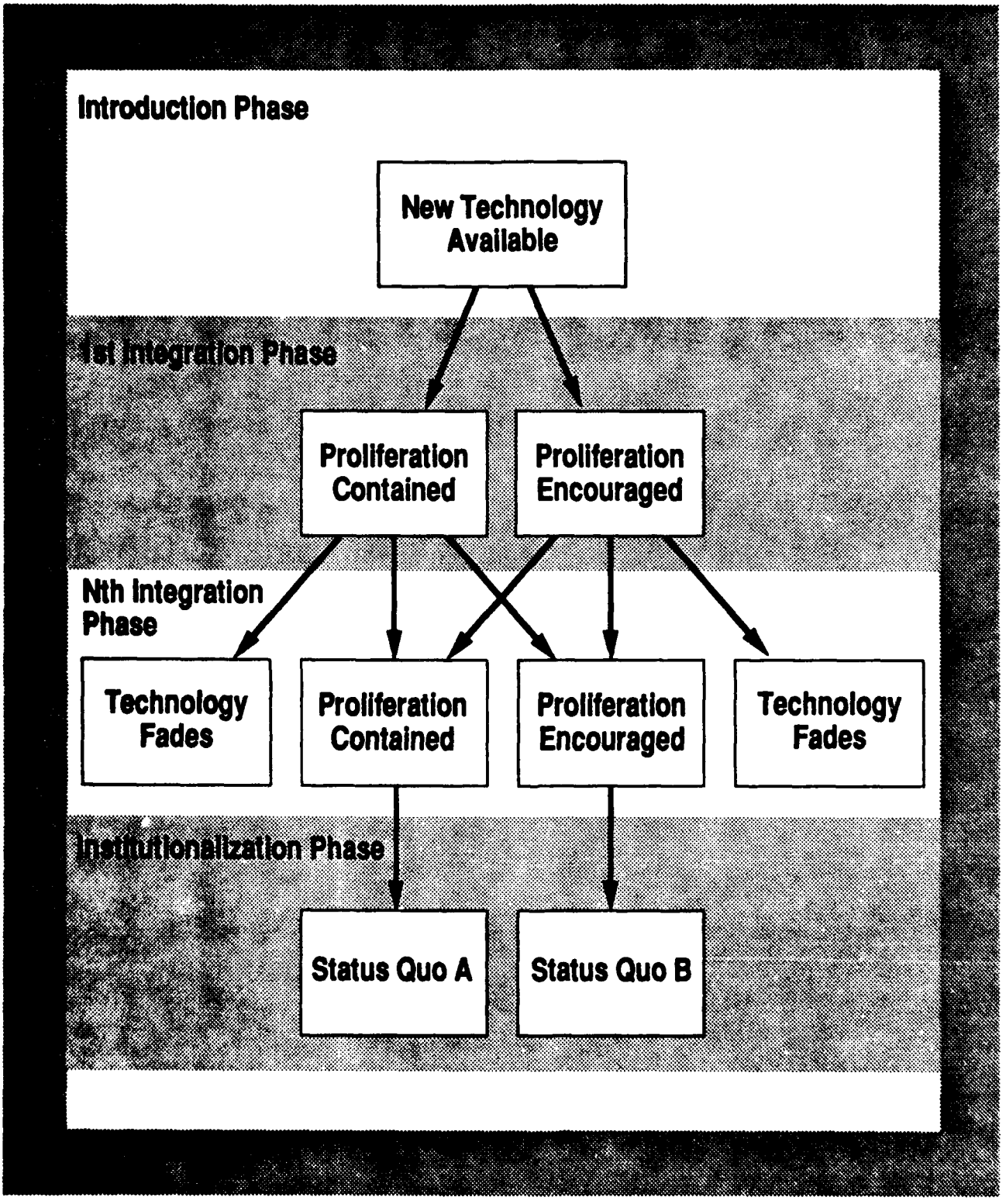

Figure 3-2

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INTEGRATION OF NEW TECHNOLOGY INTO THE ORGANIZATION

	Introduction Phase	Integration Phase(s)	Institutionalization Phase
Characteristic Users	Isolated Pioneers	Pockets of Special Interest Employees	Employees Throughout the Organization
Impetus	Grass Roots	Pressure from: • Users • Management • Competition	Operations Dependent on Technology
Organizational Attitude	Little Concern	Encourage Proliferation OR Encourage Containment	Standard Practice

Table 3-2

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3.2.1 INTRODUCTION PHASE

The introduction phase begins when the new information technology is first commercially available.

3.2.1.1 Characteristic Users: Isolated Pioneers

The first users of the new information technology are likely to be those who enjoy experimenting with new forms of technology as an avocation. These pioneering individuals are eager to determine the capabilities of the new technology. They may seek information about developments in information technology from the IC or other sources.

3.2.1.2 Impetus: Grass Roots

In the introductory period, often the impetus for using the new information technology comes from the user community. Individuals who have used the information technology to increase their personal productivity, or those who have a vision for the potential benefit of the information technology to the organization begin to press the organization's management to make the information technology available. Users may also ask the IC to provide support for new information technology.

3.2.1.3 Organizational Attitude: Little Concern

In the beginning, the management of the organization may assume that the new information technology is a passing fad or may feel that the information technology has not yet been proven.

In either case, the organization often adopts a "wait and see" attitude toward the new information technology.

3.2.2 INTEGRATION PHASE(S)

As use of the new information technology becomes more widespread, the organization may decide to encourage or discourage its use. This decision may be re-evaluated at a later date, thus initializing a new integration phase.

3.2.2.1 Characteristic Users: Pockets of Special Interest Employees

Groups of employees with specialized interests are likely to be the characteristic users in the integration phase(s). For example, those individuals with substantial accounting functions in their jobs were the first to be interested in electronic spreadsheets.

3.2.2.2 Impetus: Implementation Pressures

In the integration phase(s) the impetus to implement the information technology may come from several sources, as described below. The pressure on the organization is sufficient to cause the organization to take a position with regard to the information technology. Increasingly sophisticated users are often the impetus to implement new information technology. User demand may build to the point where the demand can no longer be ignored. There may also be pressure from within the management structure to provide this new information technology in return for the known or perceived benefits. In addition, the use of the

new information technology may be required to keep pace with the competition.

3.2.2.3 Organizational Attitude Toward Proliferation

In the integration phase(s) the organization must decide whether it wants to encourage or discourage the use of the new information technology. This decision may be either conscious or unconscious on the part of the organization. The model is valid if new technology is introduced into the organization without deliberate guidance; however, the organization will benefit from a conscious effort on the part of management to determine whether or not use of the new technology is to be encouraged.

The organization may decide to encourage the use of the new information technology. This may take the form of providing end-user support in the IC to enable users to utilize the information technology effectively. In addition, the use of the information technology may be encouraged through special procurement vehicles. In some instances use of the information technology may be required; for example, the organization may ask that all budgets be submitted on magnetic media in the form of an electronic spreadsheet.

Proliferation is also encouraged, even if the organization decides not to take an official position with regard to the information technology. Use of the information technology is likely to grow unless a specific prohibition is made and enforced.

The organization may decide to discourage the use of a given information technology for a number of reasons. The information technology may not yet be proven. It may be viewed as not cost-effective. Or it may pose interoperability problems with the installation's information architecture (Section 2.1.4).

Although the organization may not be able to prohibit the procurement and use of the information technology, it can restrict it in several ways. By providing end-user support in the IC, procurement vehicles, and maintenance contracts for "standard" information technology, the organization can discourage the use of non-standard products.

During the first integration phase, the organization may re-evaluate its position with regard to the information technology. At this point the organization may decide to encourage the use of an information technology it has previously discouraged, or vice versa. The organization may also decide not to change its approach.

3.2.2.4 Technology Fades

Sometimes due to lack of user demand or changes in the overall direction of an information technology, a specific product may fade from use. Often this information technology is replaced by a similar product. The new product then starts at the beginning of the model, with the introduction phase. Figure 3-3 shows that while use of some information technologies may decline and other activity may stabilize, new information technology is constantly being introduced into the organization.

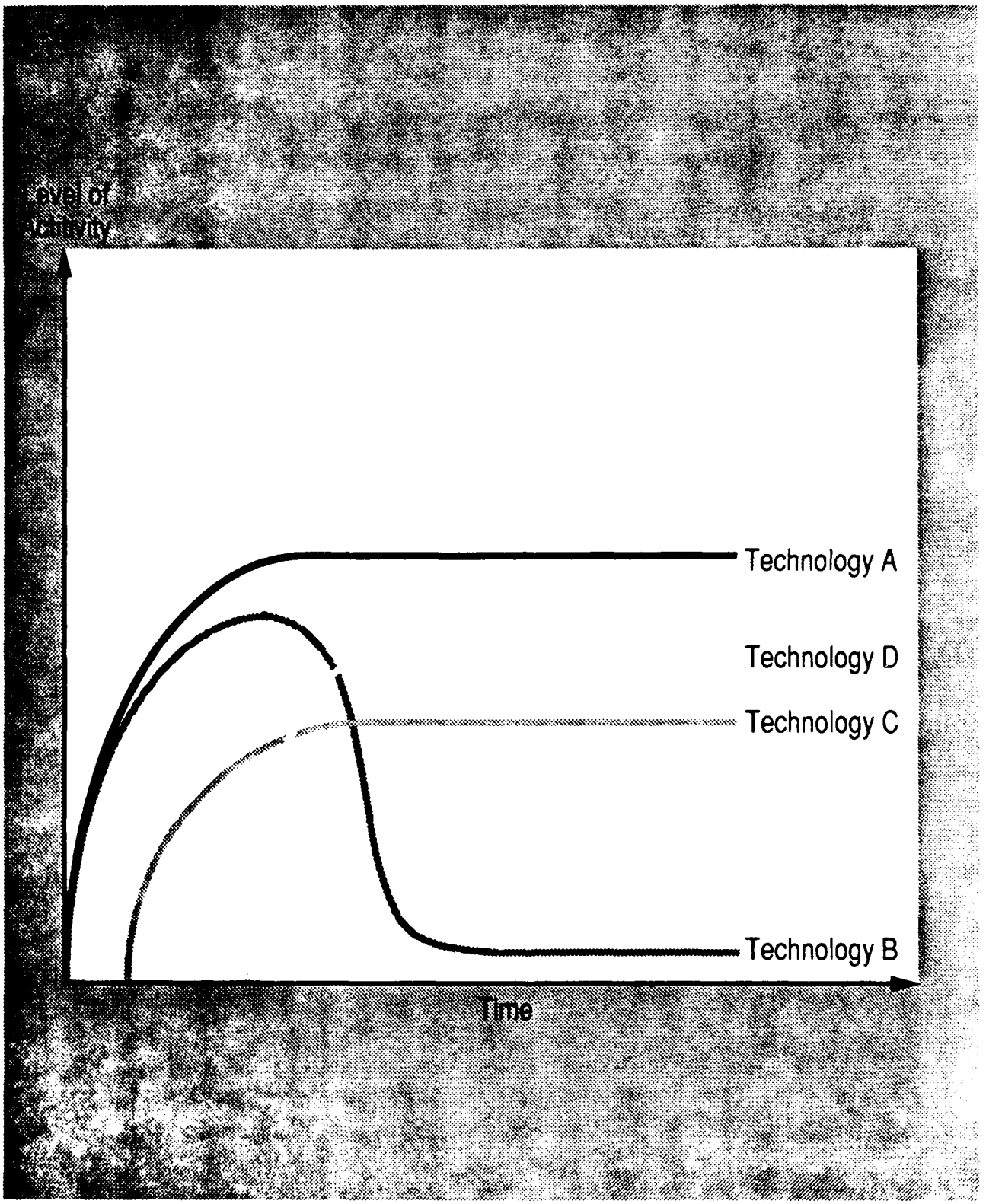

Figure 3-3

G02003/9/89

From the IC's perspective this means that the IC's services must be periodically evaluated to ensure that the IC's services support the information technology actually in use in the installation.

3.2.3 INSTITUTIONALIZATION PHASE

During the institutionalization phase, the organization's attitude toward the information technology stabilizes. The "status quo" attitude may either be that proliferation of the information technology is to be encouraged, or that proliferation of the information technology is to be contained.

3.2.3.1 Characteristic Users: Employees Throughout The Organization

If the use of the information technology is encouraged, in the institutionalization phase use of the information technology has become widespread throughout the organization. Use of the information technology is accepted as common practice. The IC will likely offer in-depth services in support of these universally used products.

If the institutionalized attitude is that proliferation of the information technology should be contained, isolated pockets of independent users may remain.

3.2.3.2 Impetus: Organizational Operations Dependent on Use of Information Technology

If the use of the information technology is encouraged, in the institutionalization phase dependence on the information

technology to perform the operations of the organization provides the impetus for the continued use of the information technology.

If the institutionalized attitude that proliferation of the information technology should be contained has been established, it will be unlikely for the organization to receive further requests for the information technology. This does not necessarily mean, however, that the information technology will not be used. Rather, if the information technology is used, its use will be covert.

3.2.3.3 Organizational Attitude: Use of Information Technology is Standard Practice

If the use of the information technology has been encouraged, in the institutionalization phase use of the information technology will have been established as standard practice. The question of whether the use of information technology should be encouraged or discouraged is no longer asked.

If the institutionalized attitude that proliferation of the information technology should be contained has been established, that decision will also be considered standard operating procedure. The question of whether the use of information technology should be encouraged or discouraged is no longer asked.

3.3 THE IC AND THE INTEGRATION OF NEW TECHNOLOGY

The IC may play three different roles in the integration of new information technology into the organization. First, the IC may be asked to monitor and evaluate new end-user technology to determine whether its use should be encouraged or discouraged in the organization. Second, the IC may be asked to introduce new information technology into the organization, acting as an agent of change. Third, if the new information technology is sanctioned by the organization, the IC will need to provide end-user support for that technology.

3.3.1 MONITORING AND EVALUATING NEW END-USER TECHNOLOGY

Since the IC supports end-users in the effective utilization of information technology, ICs are familiar with both end-users and information technology. Because of this knowledge the IC may be tasked to monitor and evaluate new end-user technology for possible integration into the organization.

The purpose of monitoring new end-user technology is to identify those developments which have potential benefit to the organization so that the organization can determine if it wants to encourage or discourage the use of the technology. In evaluating new technology, the IC's role is to assess the benefit of the technology to the organization, to determine if it is compatible with the installation information architecture, and to determine if it will meet user needs.

As part of its assessment of a new information technology the IC may also be responsible for suggesting and implementing a plan describing how the new technology can be effectively implemented in the organization. The evaluation of new technology is also discussed under the Information Management IC alternative, Section 4.3.

3.3.2 THE IC AS AGENT OF CHANGE

Once the organization has decided to encourage the use of a new information technology, the IC may be tasked to introduce the technology into the organization. This section describes the IC's potential role as change agent. The IC is an appropriate agent for introducing new technology into the workplace because the Center is familiar with the needs of the end-users and end-user technology.

The introduction of new information technology will result in differences in the workplace; it will alter the way work is accomplished and the way the organization is composed, impacting the interactions among the people in the organization. An example of how information technology might be implemented in the office of the future was presented in Section 3.1.4.

Most individuals feel comfortable with their current work procedures and therefore resist change. An individual may also resist the use of new information technology because of a variety of fears--that he will not be able to learn to use the new technology, that no one will be available to help him learn the new technology, that he will loose the status or power associated

with his job, that there will be more pressure to perform. Resistance to technology is, in reality, likely to be resistance to the way the technology will change the user's work life.

Because of the negative feelings associated with change, how the change will be introduced into the organization should be carefully planned. Change will be most easily introduced into an organization where individuals feel there is a problem in the current way of doing business. Response to change will also be more positive if the individuals who will be impacted by the change have confidence in the agent of change, the IC. The agent of change should anticipate where there will be resistance, and where there will be support for the introduction of the new technology. If the potential supporters have credibility with the potential resisters, the supporters may be able to influence the resisters.

The IC should provide the users with realistic expectations of the results of integrating the new information technology in the organization. New technology will be accepted much more readily if the users see the benefits of the technology. Therefore, any introduction of new technology must include a convincing demonstration of how the technology will help the user. The IC should also identify the support that will be available for the new information technology in the IC.

In addition to emphasizing the expected benefits, the user community should also be informed that the change will involve effort on their part and that it will take time to see the

benefits of the change. In fact during the early part of the transition period, the new technology may seem to make work more difficult instead of easier. Sharing case studies from other organizations who have implemented the same technology will enable the user community to anticipate what might occur during the transition period and to feel confident about the eventual benefits of the change.

3.3.3 SUPPORTING NEW INFORMATION TECHNOLOGY

The incorporation of new information technology into the organization also results in change in the IC's services since to be effective the IC's services must evolve with the needs of the end-user community. Additionally, the IC's services must be consistent with the organization's decision to encourage or discourage the use of a given information technology. For example, the IC should guarantee maintenance and support for only those information technologies which the organization has decided to encourage.

Although support for the new information technology should be added to the Center's services, the number of products which can be supported by the IC is limited because the IC's resources are limited. Therefore, the IC must periodically evaluate the services it offers. When the use of a technology fades (Section 3.2.2.4), the IC should reduce the services it offers in support of the fading technology. In addition, the IC can vary the depth of support it provides for a given product based on how widely the product is used and the overall level of expertise of the

user community with that product. Section 5.3 describes approaches for managing the integrated IMA IC. Additional strategies for incorporating support for specific information technologies in the IC are found in Chapters 6 - 10.

CHAPTER 4
INTEGRATION ALTERNATIVES

This chapter of the Integrated IMA IC Guide describes three alternatives, or strategies for integrating support for the IMA disciplines into the IC. The integration alternatives are: the Point-of-Contact IC, the User Services IC, and the Management Information IC. Chapter 5 will discuss how to implement the integration alternatives described in this chapter.

The integration alternatives are based, in part, on the experiences and suggestions of the ten Army organizations/installations which were listed in Table 1-1. Army policy makers, DOIMs, IC Chiefs, and IMA discipline experts were consulted. In addition, the alternatives are consistent with the guidance found in AR 5-3 and AR 25-1.

Analyzing the five IMA disciplines yields a list of the common functions performed by each of the IMA discipline areas. Although the terminology may differ, most disciplines:

- Provide a user point of contact,
- Assess user need to determine how to meet need,
- Work with users to solve subject-matter problems,
- Provide training on how to use discipline assets,
- Review IMP initiatives,
- Maintain/provide maintenance for discipline related equipment,
- Recommend policy,
- Implement policy,

- Enforce policy,
- Evaluate benefits of new technology, and
- Provide/produce an information-related product/service.

In addition to these activities, the disciplines also perform unique functions. Consistent with the objectives of the IMA, the integration alternatives presented here focus on the consolidation of similar support functions in the IC.

The integration alternatives are created by combining related functions into three groups. Each group forms one of the integration alternatives: point-of-contact; user services, and information management. There may be some disagreement about which functions belong in which alternative; however, the purpose of the integration alternatives is to provide a tool for determining how support for the IMA disciplines can be incorporated into the IC. As such, the alternatives are meant to be modified to meet the needs of each installation.

The integration alternatives are depicted using a grid, as shown in Figure 4-1. The grid format is designed as a worksheet which can be used to modify an alternative for a specific site (see Section 5.1.5). Each of the IMA disciplines is represented by one column of the grid. Each of the common functions performed by the discipline areas is represented by one row of the grid. The grid is shaded to indicate the three integration alternatives. The operations/production function is represented by an unshaded row. Operations are not usually included in the IC and are not included in the integration alternatives.

Integration Alternatives

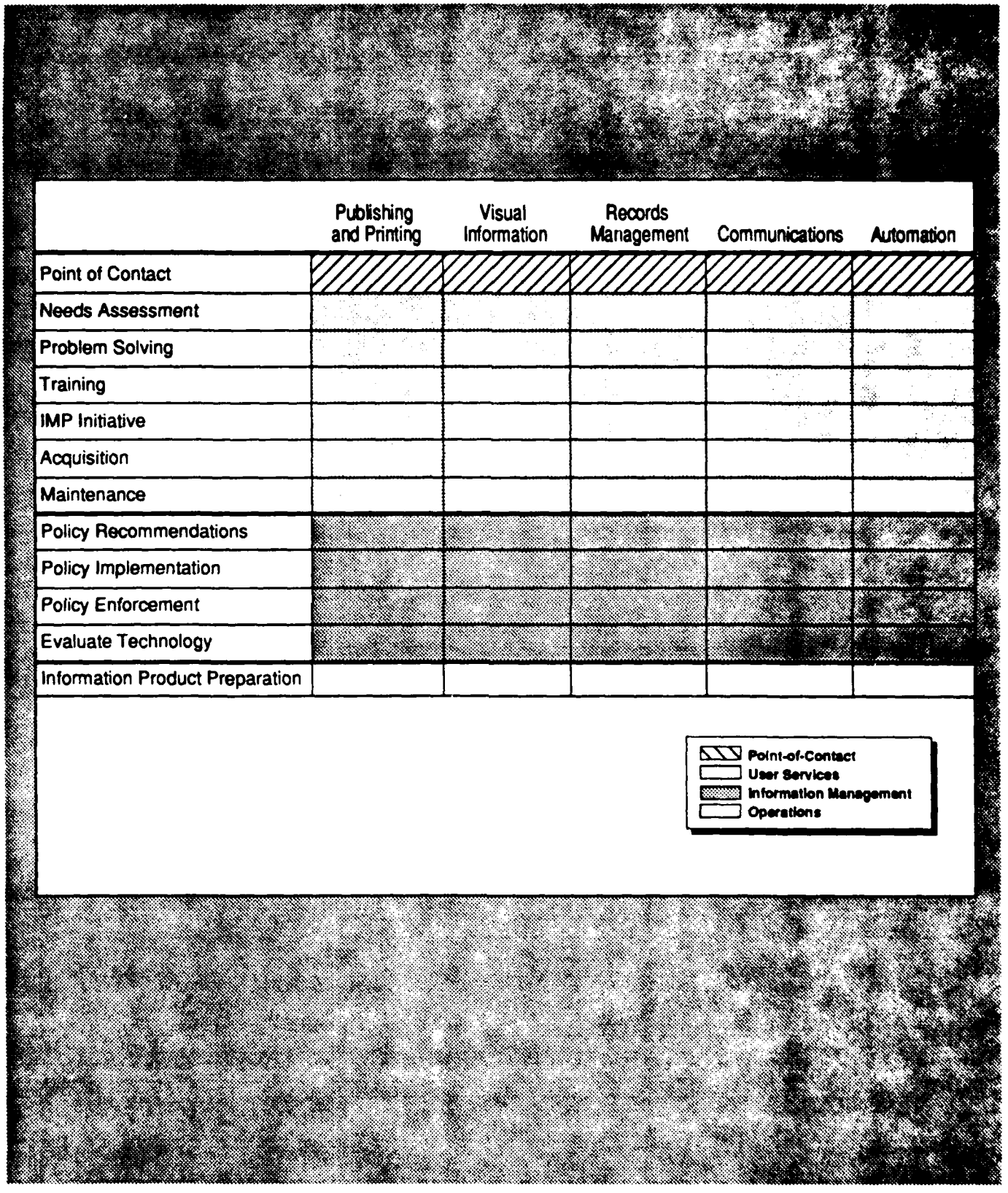

Figure 4-1

The issues associated with the transition from the present IC to an IC which provides integrated support for all five IMA disciplines are discussed for each of the three integration alternatives. Transition issues include the impact of the alternative on the IC facility, IC staffing, IC services, IC policy, and the DOIM organization. The IC's ability to manage end-user efforts under each alternative is also examined. These issues are summarized in Table 4-1. The advantages and disadvantages of each alternative are also presented in the discussion for the respective alternatives.

4.1 POINT-OF-CONTACT IC

The first alternative is the Point-of-Contact (POC) IC. This IC consists of the services currently offered by the IC, plus the point-of-contact function for all IMA disciplines that have been transferred to the DOIM. This alternative meets the minimum requirements of AR 5-3, which states that the IC "will serve as a central point of contact for user inquiries on all matters pertaining to information management." In this approach, the role the IC assumes is that of the installation's monitor of end-user information assistance requests. This alternative is depicted in Figure 4-2.

As the point-of-contact, the IC will assess the end-user's need only to the extent necessary to determine the appropriate discipline area relevant to the problem. The IC will then forward the user to the appropriate IMA discipline expert at that point. Most Army ICs currently provide this point-of-contact

IC INTEGRATION ISSUES SUMMARY

Function	Point-of-Contact IC	User Services IC	Information Management IC
Facility	No Change	More space for staff, equipment, training	No Change
Staffing	No Change	Consolidation of staff from other areas	Additional staff for additional functions
Organization	Establish Lines of Communication	Realigned/ Consolidated Organization	IMAs Support IC's role
Policy	Procedure for Tracking Requests	Delineation of Responsibilities	IC Oversees all efforts to support End-Users
Management of End-User Efforts	Loose Control	Opportunities for Control	Determines Control

Table 4-1

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Point-of-Contact IC

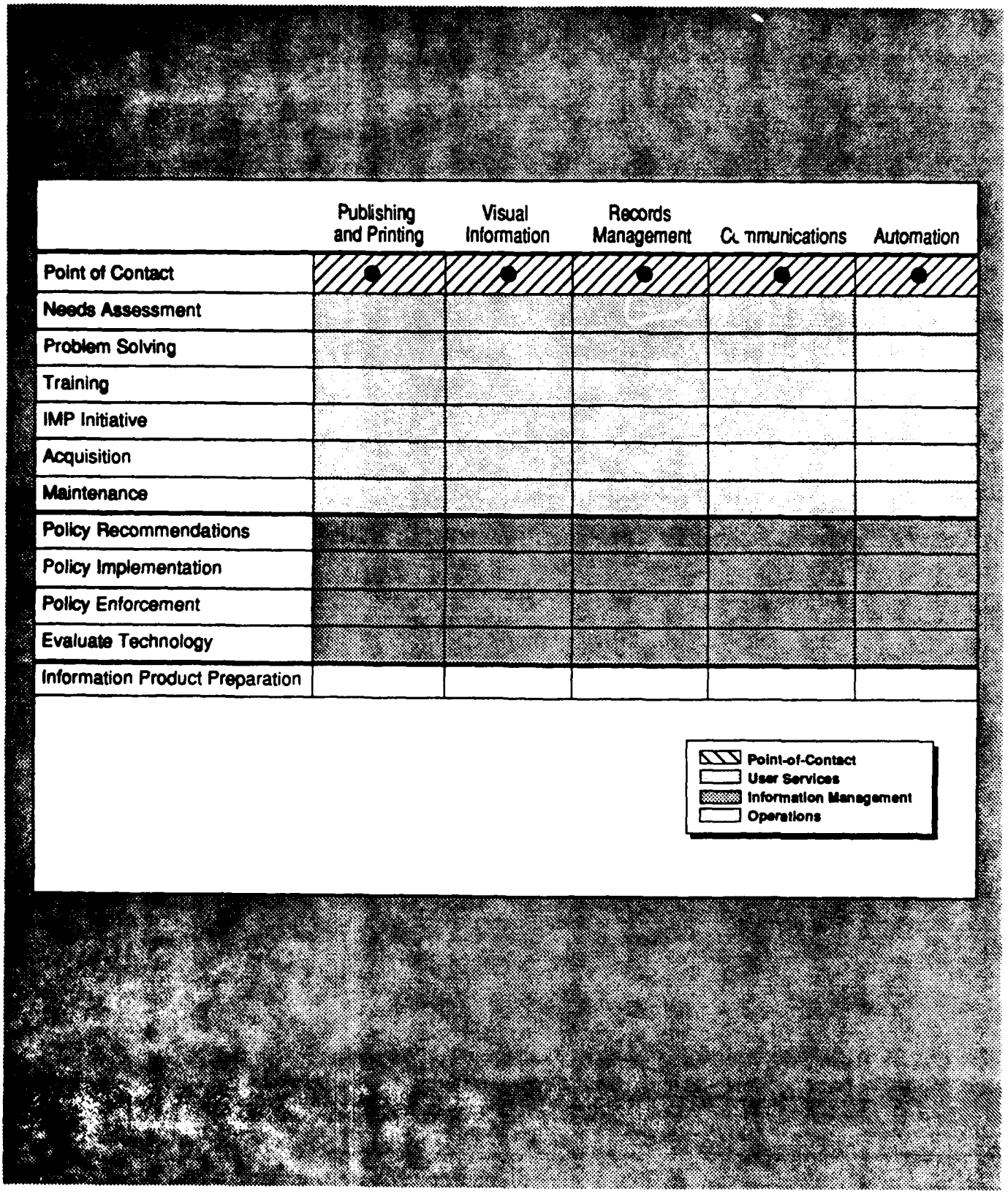

Figure 4-2

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function for the IMA disciplines. In fact, the majority of ICs go well beyond the POC alternative, especially in the area of automation.

4.1.1 TRANSITION ISSUES FOR THE POC IC

Transitioning to the POC IC will not require significant additional resources. However, it will necessitate formalizing the lines of communication between the IC and the IMA discipline areas. The transition issues for all of the integration alternatives are summarized in Table 4-1.

4.1.1.1 POC IC Facility

The addition of the point-of-contact function to the IC will not likely necessitate much additional space for the Center facility. Because the IC staff will need to become familiar with all of the discipline areas, some additional space may be required for hardware, software, and reference materials.

4.1.1.2 POC IC Staffing

Assuming the IC is adequately staffed at present, the addition of the point-of-contact function will require minimal additional IC staff. The POC IC necessitates staff awareness of the capabilities and services of all IMA disciplines. This awareness can be provided through a series of formal or informal briefings given by the IMA discipline experts.

4.1.1.3 Impact of the POC IC on the DOIM Organization

Formal lines of communication should be established between the IMA disciplines and the IC. The IC must know who in the discipline area to contact and must be assured that the contact will be responsive. A lack of responsiveness will damage the credibility of the IC since the user identifies the IC as the support organization. One DOIM established the lines of communication between the IC and the IMA disciplines in a memo which stated that the discipline areas would be "on call" to the center.

4.1.1.4 Policy for the POC IC

In addition to instituting formal lines of communication between the IC and the IMA disciplines, the IC may want to establish a policy which requires tracking user requests. Implementing this policy would enable the IC to determine the status of the user's request after the request has been transferred to the discipline area. This concept is an extension of the internal tracking systems many Army ICs already have in place. Depending on the installation's capabilities, the tracking function could be performed via electronic mail or other electronic means.

4.1.1.5 POC IC Services

In the POC IC, the IMA point-of-contact function is added to the center's services. Other IC services may remain unchanged.

4.1.1.6 Management of End-User Efforts

Under the POC IC end-user information needs are met primarily through the respective IMA disciplines, not through the IC. The IC has little ability to manage end-user efforts or to control the diversity of products users select.

4.1.2 ADVANTAGES OF THE POC IC

Of the three integration alternatives, the POC IC offers the greatest ease of implementation while still meeting the requirements of AR 5-3. This is the most significant advantage of this alternative. If the IC is sufficiently resourced at present, additional resources may not be required to implement this alternative. The novice user with an undefined information need or the new employee will receive the most benefit from having a single point-of-contact.

4.1.3 DISADVANTAGES OF THE POC IC

A disadvantage of this alternative is that experienced users may view the POC IC as an extra level of bureaucracy which offers no additional benefits. The end-user who is accustomed to going to a specific person in an IMA discipline area to resolve his problems will not see the need to go to the IC first. To avoid this problem, the IC may allow the users to approach the discipline expert directly as long as the discipline expert completes a request for assistance tracking form (see Section 4.1.1.4).

The most significant disadvantage of the POC IC is that it does not fully comply with the intent of the IMA to consolidate similar functions of the IMA disciplines. In addition, the POC IC does not clarify whether the IC or the discipline area is responsible for providing end-user support services for those information technologies (e.g., microcomputer-based desktop publishing and presentation graphics) where the IC's traditional role of automation support overlaps the subject matter of the other discipline areas.

4.2 USER SERVICES IC

A second integration alternative is the User Services IC. In addition to serving as the point-of-contact for the IMA disciplines, this IC provides those services which require direct interaction with the user. The User Services IC does not include, however, requests for information products such as print jobs from the print plant or briefing slides which are prepared entirely by the visual information shop. Figure 4-3 illustrates the User Services IC.

The User Services IC is distinguished from the current IC in that it provides integrated support. That is, the IC can draw upon any discipline area or, more likely, a combination of disciplines to meet the user's need. As developments in information technology cause the discipline areas to overlap, the solution to the user's need could involve automation, telecommunications, and one or more of the other IMA discipline areas.

User Services IC

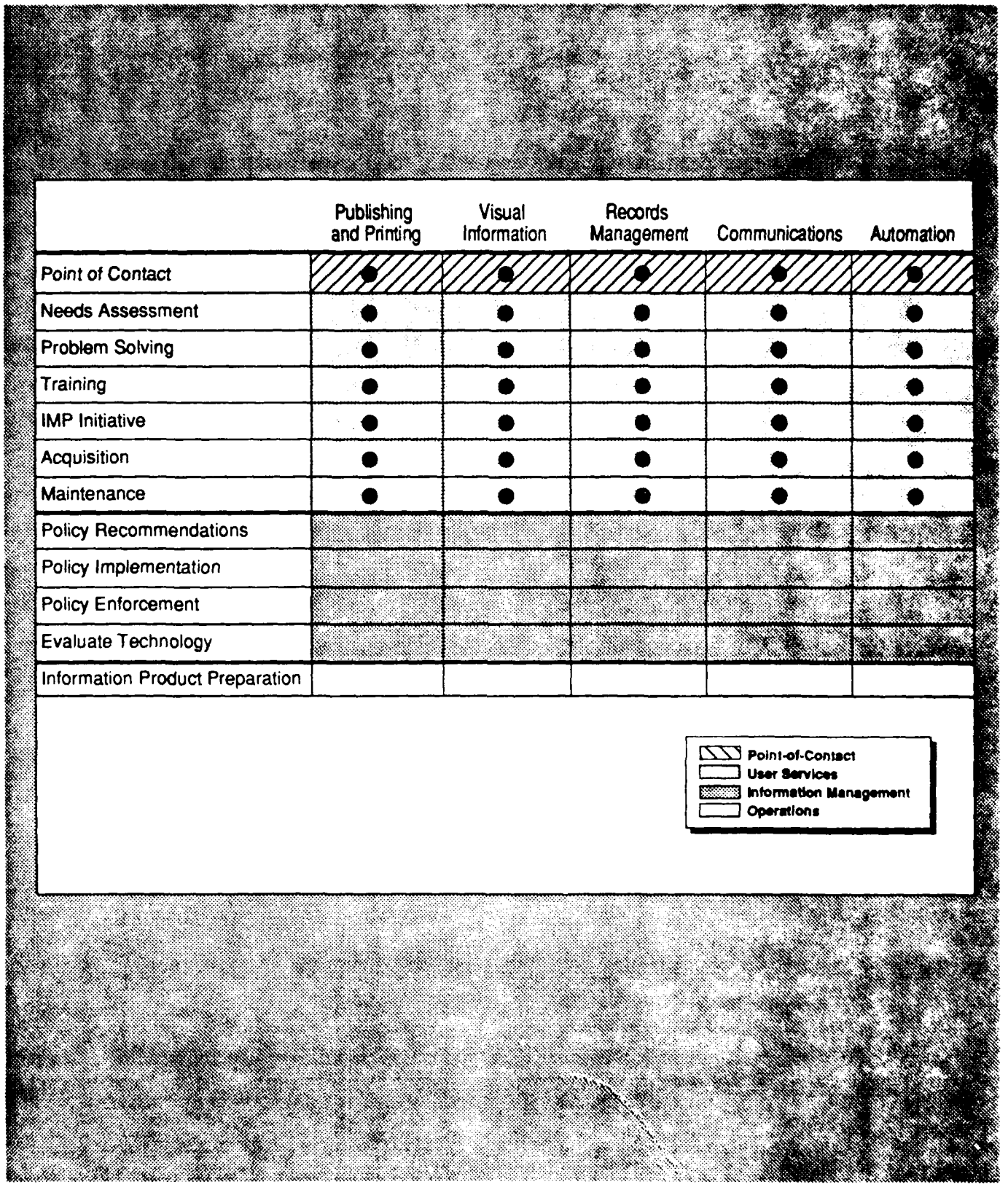


Figure 4-3

4.2.1 USER SERVICES IC SERVICES

Services provided by the User Services IC might include needs assessment, problem solving, training, CAPR/IMP initiatives, acquisition, and maintenance. The consolidation of similar end-user support functions from the discipline areas into the IC will reduce redundancy.

4.2.1.1 Point-of-Contact

As described in Section 4.1, the IC serves as the point-of-contact for end-user access to the IMA disciplines. This function is also provided by the User Services IC.

4.2.1.2 Needs Assessment

The IC will work with the end-user to define his information needs and to determine how those needs can be met. This will include a review of how the need is currently met and the information technology available to the user. Given the overlapping of information technologies, the solution to the user's need may well require an approach which integrates technology from several IMA discipline areas.

The needs assessment process might also include hands-on testing of the potential solution and a review of evaluations performed by the IC, the General Purpose Computer Support Center (GPCSC), the Computer Engineering Center (CEC), or other sources. Section 5.2.2.1 describes the specific functions of the GPCSC and the CEC.

4.2.1.3 Problem Solving

The IC will work with the end-user to solve his information problems. This technical assistance should focus on the individual's current need while providing problem solving techniques which will enable the user to become self-sufficient. For example, a user may request assistance from the IC for a program he has written that is not working properly. The IC may then advise the user on how to de-bug the program and offer general guidance on programming and de-bugging techniques.

4.2.1.4 Training

The purpose of training is to provide the user with the skills he will need to use information technology effectively. Training can be provided through instructor-led courses, user groups, computer-based instruction, and video-based instruction. Training is an area which will benefit from the consolidation of end-user support from the IMA discipline areas into the IC. Scheduling functions and training facilities can be combined. In addition some course offerings can be combined as well. For example, the IC can offer a single introductory design principles course which would be useful to individuals developing documents using desktop publishing as well as individuals developing briefings using presentation graphics software.

4.2.1.5 CAPR/IMP Initiatives

User information requirements are identified and documented using an information capability request (CAPR). If the need

cannot be satisfied at the local level, an information management plan (IMP) initiative is submitted. Both CAPRs and IMPs are submitted to the DOIM. Because the IC works one-on-one with users in defining their information needs, the IC is already positioned to help users develop their CAPR and IMP initiatives. The DOIM may ask the IC to evaluate CAPRs and IMPs. (For more information about CAPRs and IMPs see Section 2.1.4.)

4.2.1.6 Acquisition

Some Information Centers are currently involved in the acquisition of end-user hardware and software. In some cases the IC is part of the approval process. Other ICs receive the hardware and software and then distribute the products to the user community. The IC may also be involved in coordinating consolidated procurements.

If the IC is currently involved in the acquisition of end-user hardware and software, then this activity may be extended to include the acquisition of user-procured information technology for additional IMA discipline areas. The acquisition process is simplified for the user because he goes to one organization--the IC--for all of his information technology acquisition needs.

4.2.1.7 Maintenance

In some installations the IC is responsible for providing maintenance for end-user equipment. These ICs manage the installation's maintenance contract/s. If the users go outside these contracts for the maintenance of their equipment, there is

no guarantee that the repair will be paid for. Consolidated maintenance is usually more economical, and it may be possible to incorporate maintenance support for the information technology for several IMA disciplines under one contract.

4.2.2 TRANSITION ISSUES FOR THE USER SERVICES IC

The transition issues for the User Services IC focus on the additional staffing and facilities which will likely be required. Resources may be consolidated from IMA discipline areas to meet the expanded scope of the IC. The transition issues for all of the integration alternatives are summarized in Table 4-1.

4.2.2.1 User Services IC Facility

With the consolidation of user services from the IMA discipline areas in the IC, facility requirements are increased to provide space for additional equipment, staff, and classrooms. This facility does not have to be contiguous, however. With the increased use of electronic mail and other means of telecommunications, the actual location of the IC becomes less important. However, whenever possible like services should be co-located. For example, the help desk and technical assistance staff for all five discipline areas might be co-located while the training facility could be in a different location. Assuming that the DOIM activity is re-structured to align with the IMA and personnel from the IMA disciplines are assigned to the IC, then the IC facility may incorporate some of the space formerly occupied by the discipline areas.

4.2.2.2 User Services IC Staffing

The User Services IC will require additional staff as well as training for new and existing staff. Additional staff will be required to fulfill the expanded mission of the IC. Four factors will impact staff size: the number of IMA disciplines integrated into the IC; the number and breadth of services offered; the size of the user community; and the level of sophistication of the user community.

Under the User Services IC integration alternative, some personnel may be reallocated to the IC from the IMA discipline areas. However, if the discipline area is minimally staffed at present, then this personnel shift may not occur. For example, many installations have only one records manager. In this case, that individual may not be reassigned to the IC, although he will be "on call" to the Center.

If the IC has integrated support for all of the IMA disciplines in the IC, then in-house expertise is required for all five disciplines areas. Although there may be one staff member who is the "expert" for one or more discipline areas, all staff should be familiar with the scope of each discipline.

Cross training among staff will provide an awareness of the capabilities and services of all of the IMA disciplines. This training could include two activities: having the discipline expert give a briefing to the IC staff; and having each IC staff member work with a discipline expert for at least one day. It is important to note that cross training should include all

discipline areas. For example, just as automation experts need to become familiar with visual information concepts, visual information specialists need to become familiar with automation concepts.

4.2.2.3 Impact of the User Services IC on the DOIM Organization

The change resulting from the implementation of the User Services IC is just one of the changes impacting the DOIM organization as the DOIM realigns to meet the goals of the IMA. As some of the functions formerly performed by the discipline areas are incorporated into the IC, it is essential to establish clearly the responsibilities of the IC versus the responsibilities of the discipline areas. For example, it may be determined that end-users will go to the IC for support with desktop publishing if the document distribution is unofficial, but end-user support for all official publications will be coordinated with the publications and printing area. The objective of such delineation of responsibilities is to minimize the friction between the IC and the discipline areas.

Personnel shifts may be required to implement the User Services IC. As stated previously, some personnel may be reallocated to the IC from the IMA discipline areas.

The IC may elect to implement a modification of the User Services alternative using matrix management even if additional personnel are not assigned. Matrix management would provide centralized coordination of end-user services in the IC while the

IMA disciplines remain either physically or organizationally separate. The IC and the discipline areas would have a close day-to-day working relationship although discipline personnel would not report to the IC.

This approach differs from the POC IC in that the POC IC functions merely as the monitor of end-user information assistance requests, while under matrix management the IC provides the overall guidance, direction, and administrative coordination for the end-user support that is implemented by the discipline areas.

4.2.2.4 Policy for the User Services IC

The User Services IC will require a policy which clearly delineates the responsibilities of the IC and the IMA discipline areas, as previously stated in Section 4.2.2.3.

4.2.2.5 User Services IC Services

Under the User Services IC alternative, the IC's services expand to integrate those activities for the IMA discipline areas which involve direct end-user support. In many cases, the IC will offer the same services (e.g., needs assessment, training), as it does currently, but for additional discipline areas.

4.2.2.6 User Services IC Management of End-User Efforts

Centralization of user services provides potential for increased management over end-user efforts. The IC's involvement in the CAPR, IMP, and acquisition processes can ensure user

information technology meets the Army's standards of compatibility and interoperability. By limiting support to selected products, the IC can further inhibit use of diverse products.

4.2.3 ADVANTAGES OF THE USER SERVICES IC

The User Services IC integration alternative provides the Army more effective utilization of resources--both personnel and information resources. The user benefits from having integrated support to meet his information needs. The advantage to the IC and IMA discipline staff is the professional development which results from the cross-fertilization of ideas from the different IMA discipline areas.

4.2.4 DISADVANTAGES OF THE USER SERVICES IC

The major difficulty of the User Services IC will be accomplishing the transfer of resources and restructuring of the organization. There is likely to be resistance on the part of the user community and also within the DOIM organization. In addition obtaining sufficient staff with appropriate skills for the IC will be difficult. There is also the possibility that the increased organizational complexity of the User Services IC may result in increased response time to user requests.

4.3 INFORMATION MANAGEMENT IC

The third integration alternative is the Information Management IC. This IC provides the services of the User Services IC, and in addition, takes an active role in providing

direction and/or oversight of the user's involvement with the IMA disciplines. Under this alternative the IC becomes the DOIM's agent for all matters pertaining to end-user information technology. Figure 4-4 illustrates the Information Management Information Center.

4.3.1 SERVICES OF THE INFORMATION MANAGEMENT IC

All of the services offered by the User Services IC are included in the Information Management IC. Additional functions potentially included under this integration alternative are: policy recommendations, implementation, and enforcement; and new technology evaluation.

4.3.1.1 Policy Issues

Because of the IC's involvement with end-user efforts and familiarity with information technology, the IC is in the position to make recommendations to the DOIM on policy affecting the fulfillment of information requirements. Areas of policy might include the installation information architecture and the mandatory use of a given technology to meet a specified requirement. In addition, the IC may be responsible for implementing and/or enforcing the policies of ISC or the DOIM.

4.3.1.2 New Technology Evaluation

Since there are similarities in the product evaluation processes, the consolidation of these efforts in the IC will reduce redundancy. For example, the process of evaluating a new

Information Management IC

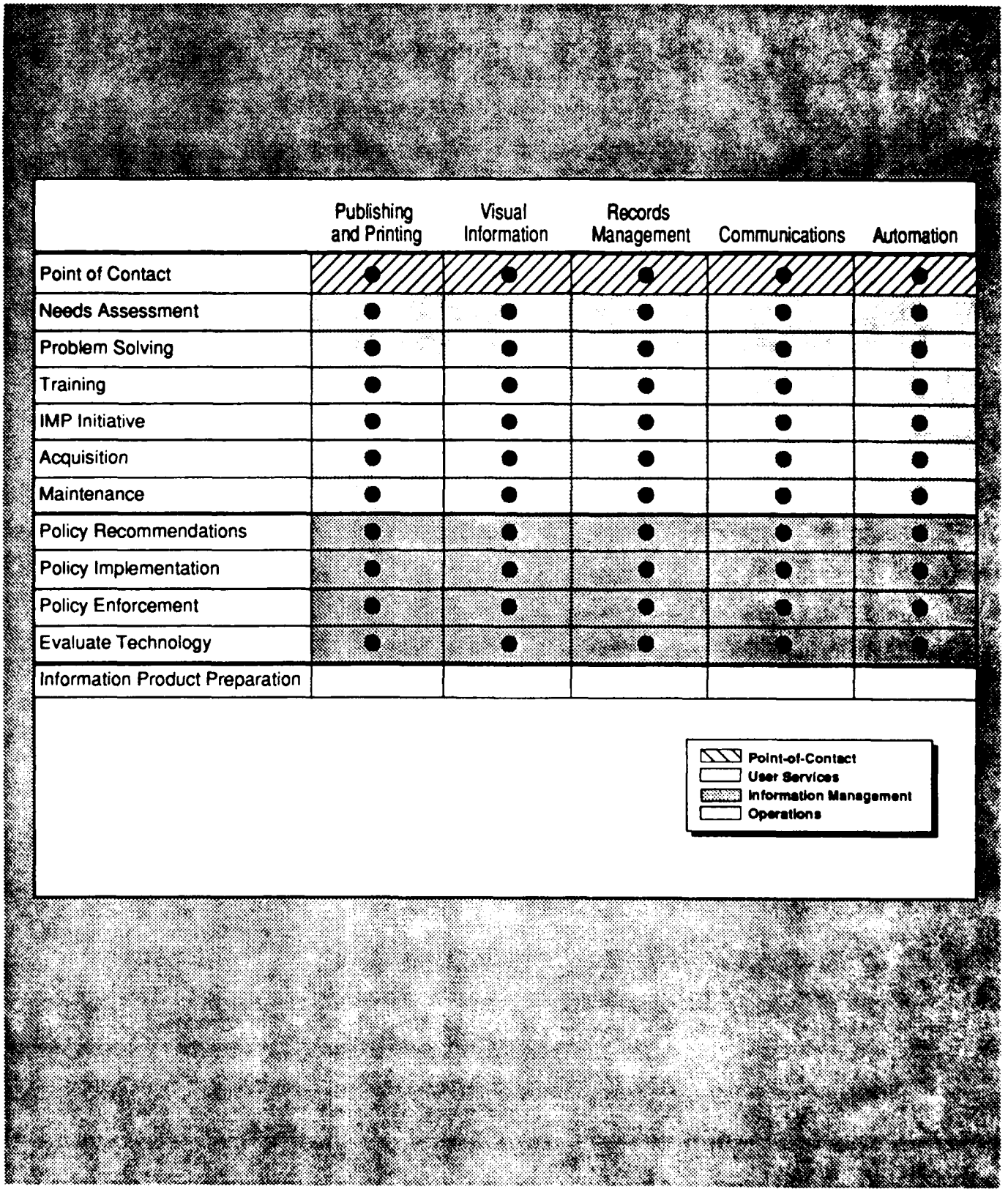


Figure 4-4

copier is comparable to evaluating a new modem. Some products may require a more extensive technical evaluation, but the basic process will be the same. In evaluating a product, the IC's role is to assess the potential benefit of the technology to the organization, to determine if it is compatible with the installation information architecture, and to determine if it will meet user needs.

4.3.2 TRANSITION ISSUES FOR THE INFORMATION MANAGEMENT IC

The Information Management IC integration alternative provides the IC optimum management over end-user efforts. The major transition issue for this alternative will be to establish the IC's role vis-a-vis the DOIM. The transition issues for all of the integration alternatives are summarized in Table 4-1.

4.3.2.1 The Information Management IC Facility

This alternative will probably not require additional space for the IC facility since the policy functions do not necessitate substantial physical space. Depending on the physical size of the product evaluated, the new technology evaluation function may require additional space, however.

4.3.2.2 Information Management IC Staffing

The policy orientation of the Information Management IC will require staff with a familiarity with both information resources management (see Section 2.1.3) and all of the IMA disciplines. The policy role may be fulfilled by the IC manager or a staff member he designates.

Depending on the frequency that new information technology is evaluated for the organization, new technology evaluations may be conducted with existing technical staff or additional staff may be added. Even if additional staff is added to the IC, new technology evaluation should be a part each staff member's position description so that the perspective of several discipline areas is represented in the evaluation process.

4.3.2.3 Impact of the Information Management IC on the DOIM Organization

Under the Information Management IC, the DOIM delegates to the IC responsibility for all end-user efforts. The DOIM and the IC will need to define carefully the role of the IC as it pertains to the overall responsibilities of the DOIM. The other organizational elements under the DOIM, although not reporting to the IC, must be responsive to the role of the IC.

4.3.2.4 Policy for the Information Management IC

As stated in Section 4.3, the Information Management IC provides direction and/or oversight of all end-user efforts. This policy must be clearly communicated to both the DOIM organization and the user community.

4.3.2.5 Information Management IC Services

The Information Management IC integrates most functions currently performed by IMA discipline areas with the exception of operations. In addition, the IC serves as the policy maker and

enforcer on matters pertaining to end-user efforts. The evaluation of new information technology is also added to the IC's services.

4.3.2.6 Information Management IC Management of End-User Efforts

Through the development and enforcement of end-user policy, the IC manages end-user efforts in the installation. Evaluation of new information technology also allows the IC to influence which products are used in the organization.

4.3.3 ADVANTAGES OF THE INFORMATION MANAGEMENT IC

The Information Management IC assigns the responsibility for all aspects of end-user efforts to the IC. The advantage of this integration alternative is that it places the IC in the position to plan and manage end-user efforts.

4.3.4 DISADVANTAGES OF THE INFORMATION MANAGEMENT IC

The Information Management IC is a very powerful entity under the DOIM. The disadvantage of this alternative is that there may be resistance from the IMA discipline areas if they feel the IC is usurping their span of control.

4.4. INFORMATION SYSTEMS FACILITY

If the integration alternatives are viewed as a continuum with the NOC IC at one end the opposite end of the continuum would be an Information Systems Facility (ISF). The ISF, which will be described in the new DA Pamphlet 25-7, is envisioned as a single facility where all the user's information needs are met.

The ISF includes the operational aspects of the IMA discipline areas as shown under the information product preparation row of the grid illustrated in Figure 4-1. The ISF might house the installation's print plant, computer facility, communications center, visual information facility, and the IC. For example, the user could receive such information products as print jobs from the print plant, briefing slides from the visual information shop, or computer printouts from the same physical facility. These operations are beyond the traditional scope of the IC; thus the ISF is not presented as an integration alternative.

CHAPTER 5
IMPLEMENTING THE INTEGRATED IMA IC

Chapter 4 presented three alternatives for integrating support for the IMA disciplines in the IC. This chapter suggests a process for implementing the integrated IMA IC. A more detailed approach for achieving the IC concept is found in the Information Center Planning and Implementation Guide, the companion guide to this document.

5.1 DEFINE IC CONFIGURATION

The first step in the implementation process is to determine, given the environment in which the IC will operate, what kind of IC will best meet the needs of the installation.

5.1.1 *ASSESS CURRENT STATUS OF INSTALLATION*

If the IC is to be effective, it must understand the organization which it serves.

5.1.1.1 IMA Disciplines Under the DOIM

In planning for the integrated IMA IC, the IC should determine if all of the IMA disciplines have been transferred to the DOIM at the installation. Support for those disciplines which have been transferred to the DOIM organization should be integrated into the IC before those disciplines which have not yet transferred.

5.1.1.2 Installation Information Architecture

The installation information architecture (see also Section 2.1.4) describes the existing information requirements and includes plans for how those requirements will be met. Automated and manual information systems are included in the information architecture. The installation information architecture also includes the optimum information and resource capabilities, regardless of present resource availability, needed to support the organization's mission. This architecture includes a description of the relationships between the elements of the installation's information management.

The installation's Information Requirements Study (IRS), Information Systems Plan (ISP), and/or Information Management Plan (IMP) support the installation information architecture. Familiarity with these documents and the installation's information architecture will provide the IC with an overview of the information needs of the organization.

5.1.1.3 Philosophy Toward Technology

Most organizations have developed, either consciously or unconsciously, a philosophy toward information technology. For example, an organization's stance can be either pro-active or re-active. Under the pro-active mode, the organization deliberately seeks to introduce new technology into the workplace to obtain specified benefits. A pro-active organization is often one of the first to implement a new or improved information technology.

A re-active organization uses proven information technology to meet established information needs.

The pro-active versus re-active philosophy is related to the the model for introducing new information technology into the organization which was presented in Chapter 3. A pro-active stance will have the effect of encouraging the proliferation of new information technology while the re-active stance will discourage the use of new information technology.

5.1.1.4 Identify Existing User Support Services

The IC should identify existing user support services within the installation to prevent any unnecessary duplication of effort in the IC. The IC should determine:

- Support currently offered by the IMA discipline areas to end-users;
- Information technology training currently available via the Civilian Personnel Office (CPO), or other groups on post;
- Support mechanisms currently used (e.g. user initiated user groups).

5.1.1.5 Level of Computer Literacy

A factor which will impact the services provided by the IC is the level of computer literacy in the installation. For example, an organization which includes a scientific community already well versed in computer usage will require different

support from the IC than that required by an organization whose users are mostly managers and policy makers.

Nearly all new, entry-level employees have had some exposure to computers during their education. This factor means that they have more knowledge and less fear of computers than most current employees. While current personnel may need training in basic concepts, new employees will require more in-depth assistance with specific problems.

5.1.2 DEFINE MISSION OF THE IC

When the IC has an understanding of the organization it will serve, it will then be able to define a mission which will meet the needs of the organization. Because each IC is developed for a specific organization, IC mission statements vary widely. Two themes are common to most IC mission statements: making information technology available to the end-user; and promoting end-user self-sufficiency in the use of information technology while providing assistance as needed.

The mission statement should define the goals of the IC and describe how the goals will be accomplished. The statement should also establish what functions are appropriate as well as those functions that are not appropriate for the IC environment. For example, if the IC does not perform applications programming, this should be made clear in the IC's mission statement.

5.1.3 SUMMARY OF IMPLEMENTATION ALTERNATIVES

Three implementation approaches were defined in Chapter 4: Point-of-Contact IC; User Services IC; and Information Management IC. These alternatives are summarized below.

The Point-of-Contact IC provides a single source of information for all of the IMA disciplines which have transferred to the DOIM. Under this alternative, user requests for information and assistance are received by the IC and then forwarded to the appropriate discipline area for resolution. This alternative is the easiest to implement in that it does not require substantial additional resources; however, only new users benefit from this implementation strategy.

Under the User Services IC alternative, the IC provides integrated support for those services which require direct interaction with the end-user (e.g., needs assessment, training) in order to meet the user's information needs. These services are added to the point-of-contact function. This alternative fulfills the goal of the IMA to achieve effective utilization of personnel and information resources through the integration of the five disciplines. Implementing the User Services IC will require additional resources, which may be accomplished by transfer of personnel or restructuring the DOIM organization.

The third integration alternative is the Information Management IC. Under this alternative, the IC becomes the DOIM's agent for all matters pertaining to end-user information technology. Because the IC is the organizational element most

closely attuned to the user community, the Information Management IC can represent user interests in matters of policy and in the evaluation of new technology for the organization.

5.1.4 SELECT INTEGRATION ALTERNATIVE

The IC integration alternative should be selected based on an understanding of the installation, the composition of the DOIM organization, and the mission established for the IC. A current and target configuration may be identified. For example, given the present DOIM organization, the User Services IC may be identified as the integration alternative of choice; however, the IC may determine that the Information Management alternative is its long-range objective.

The Point-of-Contact alternative may be selected as the integration alternative at installations where the IMA disciplines have been recently consolidated under the DOIM. This alternative may also be implemented at installations where resource limitations make implementation of another alternative impractical.

The User Services IC alternative is indicated for those installations where the goal of the DOIM is to restructure his organization to integrate the policy and operations of the IMA discipline areas.

The integration of the IMA disciplines under the DOIM is also a prerequisite for the Information Management IC. In addition, under the third alternative the IC is designated as the

users' representative in matters of policy. Implementation of this alternative requires an agreement between the DOIM and the IC manager, affirming that the IC's policy role is appropriate for the organization.

The following methodology, based on the grid shown in Figure 4-1, may be used to identify an integration alternative for the IC. To obtain the baseline of the IC:

- Place a check in the box on the grid for each function currently performed by the IC; and
- Place a check in the box on the Point-of-Contact row for every discipline area which has been transferred to the DOIM, since AR 5-3 requires the point-of-contact function. Place an x in the box for any discipline area which has not transferred.

An examination of the baseline grid may reveal trends which will help determine which integration alternative is appropriate for the IC. For example, if thirty percent or more of the boxes are checked in the User Services portion of the grid but only a few in the Information Management section, the immediate goal of the IC may be to implement the User Services alternative.

5.1.5 MODIFY APPROACH TO FIT SPECIFIC INSTALLATION

The grid may also be used to modify the selected alternative for the needs of the installation. For example, if adequate information technology training is offered by the CPO, each of the boxes in the training row will be marked with an x to

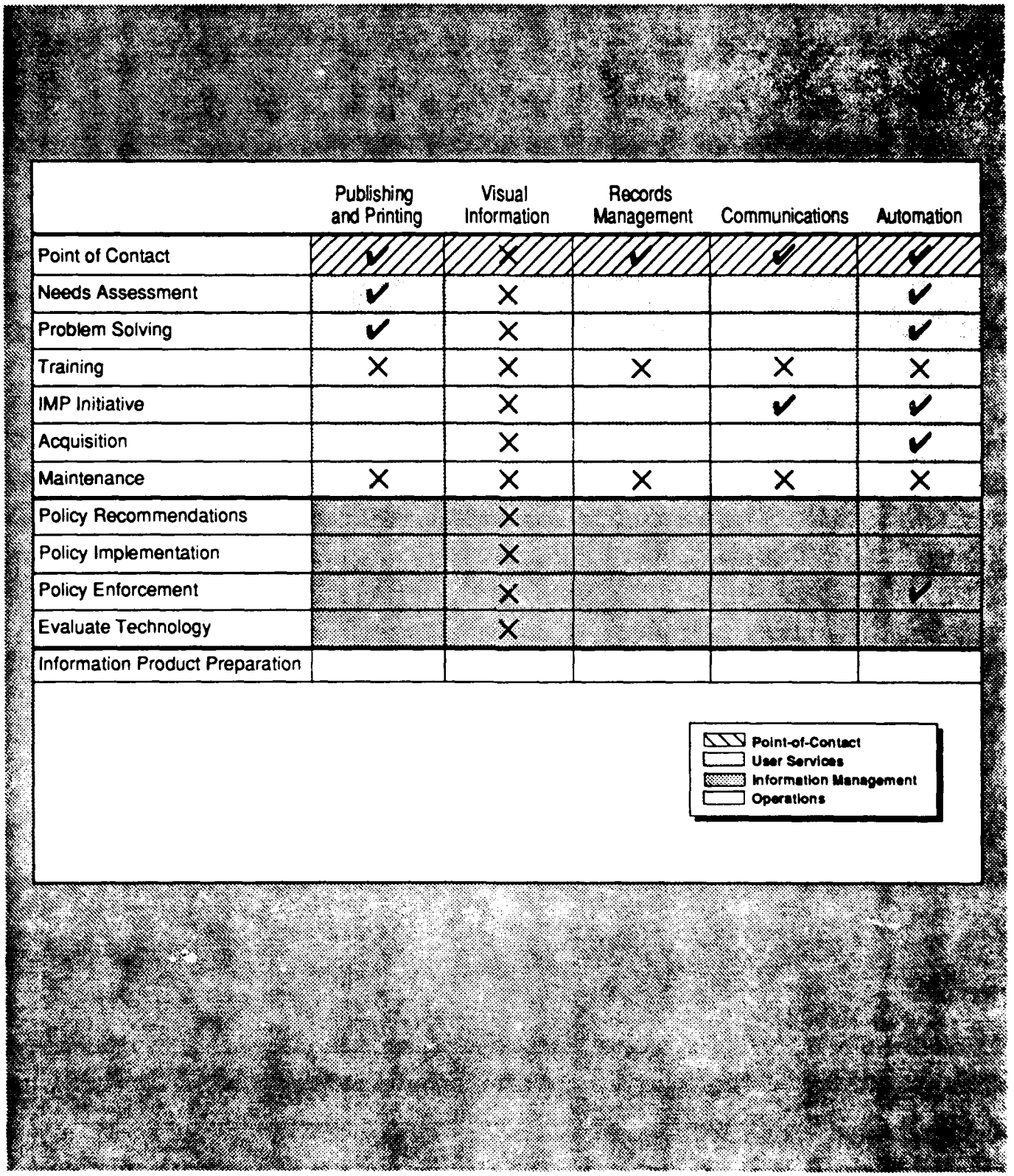
indicate that the IC will not offer that service. Also, the boxes for any discipline areas which have not transferred to the DOIM will probably be marked with an x.

In addition, the DOIM and the IC manager may determine that one of the functions on the grid is not appropriate for their installation. For example, the site may feel that formal evaluation of new technology is not needed at the installation, so this function will not be included in the IC. In this example, every box in the row labeled "evaluate technology" will be marked with an x.

Figure 5-1 illustrates how the grid would be completed for a hypothetical IC at an installation where the operational control of the visual information shop has not transferred to the DOIM and where the CPO provides technology training. This hypothetical IC has been in existence for several years and has mainly supported users of automation technology. For the past year the IC has had an agreement with the the publishing and printing shop that the IC would provide needs assessment, problem solving, and IMP initiative assistance to users of desktop publishing software. The hypothetical IC also helps users define their automation and communications IMP initiatives but has not been involved in equipment maintenance. Users at this installation must submit their requests for computer technology through the DOIM so that the IC's role is to enforce the installation's policy as stated in the installation's

Selecting An Integration Alternative

Example



	Publishing and Printing	Visual Information	Records Management	Communications	Automation
Point of Contact	✔	✔	✔	✔	✔
Needs Assessment	✔	X			✔
Problem Solving	✔	X			✔
Training	X	X	X	X	X
IMP Initiative		X		✔	✔
Acquisition		X			✔
Maintenance	X	X	X	X	X
Policy Recommendations		X			
Policy Implementation		X			
Policy Enforcement		X			✔
Evaluate Technology		X			
Information Product Preparation					

Figure 5-1

information architecture. In this example, the DOIM wishes to retain policy making as his purgative.

After completing the grid, the DOIM and the IC manager analyze the results. Since few of the IC's current offerings are in the Information Management area, implementing the User Services alternative is the immediate goal. The first priority of the IC will be to add the point-of-contact function for communications and records management. As a second step the IC will add support for IMP initiatives and acquisition for publishing and printing, records management, and visual information. Finally, the hypothetical IC will add needs assessment and problem solving support for records management and communications. The IC plans to phase in these services over a one year period and at the end of the year to evaluate the feasibility of adding maintenance support. The Information Management functions will also be re-examined at that point.

5.1.6 DEFINE ADDITIONAL SERVICES

Once the IC has selected an integration alternative and modified the alternative for the specific installation, additional services will probably need to be added. The blank boxes in the grid (see the example in Figure 5-1) indicate those services the IC may wish to add to implement fully the selected integration alternative. The IC functions and services for each of the integration alternatives were described in Sections 4.1, 4.2.1, and 4.3.1.

5.1.7 DEFINE IC ORGANIZATIONAL STRUCTURE

Integrating support for the IMA disciplines in the IC will require changes in the staff organization, staffing requirements, and staff responsibilities. The impact of each integration alternative on staffing is summarized in Sections 4.1.1.2, 4.2.2.2, and 4.3.2.2.

5.1.7.1 Staff Structure

Each of the services and functions checked on the integration alternatives grid must be supported by one or more staff members in the IC. How staff functions are combined into positions may vary based upon the number of staff resources available for the IC. Not each service or function will require a separate staff member, however. While each individual should have well-defined areas of responsibility, some activities may overlap. For example, although training is the primary responsibility of the training staff, trainers may also serve as problem-solving consultants. The user may feel more comfortable asking a technical question of his instructor because a rapport has already been established than approaching an officially designated IC consultant.

5.1.7.2 Staffing Requirements

Staffing is critical to the success of any organization. Like any service organization, the reputation of the IC will be created by the individuals who staff it. The IC's services should be determined before planning staffing requirements. The

specific responsibilities and skills of the staff will be dictated by the services provided by the IC.

Unfortunately, there is no magic formula for determining specific staff size requirements. Ratios in industry for the number of IC staff to users vary from one IC staff for every ten users to one IC staff for every 150 users. One staff member for every 50 users is probably the most common ratio. Note that these ratios are for the number of users per IC staff member. The ratios are not based on the number of potential users or the total number of personnel in the organization.

In addition to the size of the user community, other factors will impact staffing requirements including: number and breadth of services offered in the IC; level of computer literacy in the user community; number and diversity of products supported in the IC; and the available resources.

5.2 IMPLEMENTATION PLANNING

Once the integration alternative is selected and the configuration of the IC is determined, the focus of attention shifts to planning for the implementation of the integrated IMA IC.

5.2.1 STRATEGIES FOR IMPLEMENTATION

This section describes two strategies which will assist the IC in implementing the selected integration alternative.

5.2.1.1 Phased Implementation

As discussed in the previous chapter, each integration alternative, except the first, can be implemented in phases using two different approaches. First, the IC can integrate by function, that is the IC can provide the same service (e.g., training) across all discipline areas. Additional services can be added during subsequent implementation phases. Second, the IC can integrate by IMA discipline (i.e., visual information) providing all of the specified functions for that discipline. Additional disciplines can be added in subsequent implementation phases.

5.2.1.2 IMA Steering Committee

The creation of an IMA steering committee is proposed to guide the IC's integration efforts. The purpose of the IMA steering committee would be to provide a forum for discussion on the integration of the IMA disciplines and other information management issues at the installation. The goals of the committee would be to provide continuing interface between discipline areas, coordinate efforts to support users, and act as a strategic information management team. As part of its function, the IMA steering committee would provide input to the IC on the implementation and maintenance of integrated support for the IMA disciplines in the IC. The steering committee should include the top manager of each of the IMA disciplines, the DOIM, the DCSIM, and the IC manager. In addition, user representatives

should be included on the committee to ensure that the information management needs of the user community are addressed.

AR 25-1 describes the concept of an installation Information Management Support Council (IMSC). This council is to be established by the installation commander. The IMA steering committee functions described above can be part of the IMSC charter; however, if the IMSC has not yet been implemented at the installation, the DOIM and the IC manager would benefit by initiating the organization of the IMSC or an IMA steering committee.

5.2.2 DEFINE ORGANIZATIONAL INTERFACES

AR 5-3 places the IC in the DOIM organization. However, defining the IC's relationship with other organizational elements is part of the implementation planning process. Defining organizational interfaces will enable the IC to determine what resources can be shared and which activities must be supported separately.

5.2.2.1 ISC Technical Support Structure

The IC has access to ISC's technical support structure. The Information Systems Engineering Command (ISEC) includes two activities of particular interest to ICs: the General Purpose Computer Support Center (GPCSC) and the Computer Engineering Center (CEC). The information provided below has been provided by GPCSC and CEC.

The GPCSC's mission is to provide direct and general support to DOIMs, DCSIMs, Army and Joint Service Contract micro and minicomputer users and user groups, and PM-Army Information Systems. In addition, the GPCSC performs research and evaluation of small computer software, and distributes technical and non-technical information for all IMA disciplines. GPCSC is an element of the Information Systems Software Center and is located in Falls Church, Virginia. The services and support provided by GPCSC are described in more detail below.

GPCSC provides a bi-monthly distribution of material to DOIMs, DCSIMs, and other IMA discipline activities. This DOIM/DCSIM Information Package includes vendor technical bulletins, software evaluation reports, a summary of the problems received by GPCSC's help desk, information pertaining to the Army and Joint Service contracts, and micro/mini integration for all IMAs.

The GPCSC's electronic bulletin board provides current information on hardware and software evaluations, usage, and operational tips. Also included are the status of Army and Joint Service contracts, and flash bulletins. In addition the bulletin board provides a forum to contact users or user groups for problem resolution or information. Information may be retrieved on-line or downloaded. It can be accessed twenty-four hours a day by any standard microcomputer that uses common communication protocols. The modem should be set for eight data bits, one stop bit, no parity, and full duplex at 1200 or 2400 baud rates.

Telephone numbers are commercial 703-756-5637 or autovon 364-5637.

GPCSC's help desk provides information in response to questions on off-the-shelf products. Expertise is available on applications software, compilers, utilities, operating systems, telecommunications, micro and minicomputer configurations, and micro and minicomputer requirements. Information pertaining to Army and Joint Service contracts is also available. The help desk is staffed from 0700 to 1630 Eastern Standard Time and may be reached by dialing commercial 703-756-5101/5102 or autovon 364-5101/5102. In addition 800 numbers are available. From Virginia dial 800-468-7783. All other users dial 800-626-3206. Questions may also be left during off duty hours on telephone recorder on commercial 703-756-5971 or autovon 364-5971. DDN access is also available on GPCSC@SIMTEL20.ARMY.MIL.

The software clearinghouse at GPCSC provides an on-line data base of information on over 2,500 Army user-developed programs, applications, templates, shells and forms for micro and minicomputers. The data base is available twenty-four hours a day to any microcomputer that uses common communications protocols. The database can also be accessed via 703-756-9098 or autovon 364-9098. The modem should be set for eight data bits, one stop bit, no parity, and full duplex at 1200 or 2400 baud rates. For further information call commercial 703-756-5137 or autovon 364-5137. DDN access is also available on CDGIB@MELPAR-EMH1.ARMY.MIL.

In addition, GPCSC provides guidance and assistance on the establishment and management of Army user groups, their meetings and conferences. GPCSC is the sponsor of several user groups including: the Information Technology User Group, the DoD Information Exchange, and the Washington Area Mini/Microcomputer User Group. User group information may be obtained by calling commercial 703-756-5124/5125 or autovon 364-5124/5125.

The CEC is part of ISEC's Systems Engineering Directorate and is located at Fort Huachuca, Arizona. The mission of CEC is fulfilled through five activities. First, the CEC maintains a laboratory facility including an extensive selection of state-of-the-art military and commercial computer systems. This equipment is used to resolve compatibility issues involving the integration of hardware from multiple vendors. This hardware is also used in the second activity, providing consultation services to Army users and designers of Army computer systems world-wide. Most current automated systems configurations in the Army can be duplicated in the CEC. Under these conditions, the CEC staff A third activity of the CEC is to develop prototype computer systems and establish laboratory and "real world" benchmarks on the systems. The evaluations performed by the CEC are the basis for technical reports which provide the Army user with realistic performance predictions for a given system configuration. Fourth, in support of site specific projects of the Systems Engineering Directorate, CEC provides Army-wide custom computer systems engineering. The fifth activity of the CEC is to address world-wide computer systems interoperability engineering

issues by maintaining connectivity with communications networks including DDN, PROFS, and ASIMS. For further information or assistance the CEC can be contacted via commercial telephone 602-538-7470/7451/7452, autovon 879-7450, 800-233-3984 (except Arizona), and DDN ASQB-SEP-C@SIMTEL20.ARPA.

5.2.2.2 Relationship with IMA Discipline Areas

The integrated IMA IC will require a clear delineation of responsibilities for the IC and each of the IMA discipline areas. Such definition of responsibilities avoids duplication of effort in providing user support. In addition, since all user support efforts are specifically assigned, this strategy prevents any user support from "falling through the cracks."

This delineation of responsibilities implies formal lines of communication between the IC and each of the IMA discipline areas. Specified points-of-contact should be established in each organization. For the integrated IMA IC to be effective, both the IC and the discipline areas should acknowledge their interdependent roles and be responsive to each other's concerns.

5.2.2.3 The IC and the CPO

As with the IC's relationship with the IMA disciplines, it is important to define responsibilities and lines of communication for the IC vis a vis the CPO. During the implementation planning phase the IC should determine how it can work effectively with the CPO to provide training. Many young ICs focus heavily on training, offering courses which are

developed and taught by IC staff. As they mature, the trend is to contract for training or to shift part of the responsibility to the organization's training office.

There are several alternatives for how the IC and the CPO can share training responsibilities. The IC can develop courses which are then offered and taught by CPO. Alternately, the IC can teach classes with its own staff but have students register for these classes through the CPO, or the IC can develop classes to supplement those offered by the CPO. Since training programs are an administrative burden to the IC, it is to the advantage of the IC to make use of the expertise of the CPO whenever practical.

5.2.3 ANNOUNCE NEW SERVICES

Part of implementation planning should include deciding how to inform the user community the IC's services have changed. Notices may be placed in the IC newsletter, in the installation's newspaper, and on traditional or electronic bulletin boards. The IC's redefined role can be included in management briefings. In addition, the IC may wish to have an open house to encourage the user community to get acquainted with the new IC.

5.2.4 DETERMINE MEASURABLE OBJECTIVES

During implementation planning, the IC should define what methods will be used to determine if the IC accomplishes its mission (see Section 5.1.2). Typically objective statements are used to define the services and activities the IC will implement

to fulfill its mission and goals. In preparing the objectives of the IC, specific, measurable results should be defined. For example, a mission statement might say that the IC will assure the effective implementation of information technology in the installation. The corresponding goal could indicate that the IC will provide training on software commonly used at the installation. A specific objective statement might be to train 70% of clerical personnel on the word processing package within 90 days after the software is received.

5.2.5 DEFINE IMPLEMENTATION MILESTONES

After the IC has determined a strategy for implementing the selected integration alternative and interfacing with other organizational elements, the IC should define each action or milestone that must be accomplished. For example, a milestone might be to develop a written memorandum of understanding between the IC and the CPO, describing the responsibilities of both the IC and the CPO for end-user training. Another milestone could be to restructure the IC staff to incorporate new responsibilities. As the milestones are defined, they should be organized into a schedule with specific dates identified.

5.2.6 PREPARE WRITTEN IMPLEMENTATION PLAN

The implementation plan summarizes the planning process described in this chapter. The plan documents the major events which must take place to accomplish the implementation of the integrated IMA IC. Specifically, the plan should include:

- A summary of the current status of the installation;
- The mission of the IC;
- The integration alternative selected, and the reason for the selection;
- The long-range implementation objective, if different from the current integration alternative;
- What activities need to be added to implement the selected objective;
- How the IC staff will be organized to meet the IC's new mission;
- How the IC will determine if it has met its objectives;
- How the IC will interface with other organizational elements; and
- A description of the implementation milestones and schedule.

5.3 MANAGEMENT OF THE INTEGRATED IMA IC

Implementing the integrated IMA IC will provide increased challenges for IC managers. While the techniques described here are applicable to any IC, they may be particularly useful to IC managers who are expanding the services of their ICs.

5.3.1 EXPANDED EXPECTATIONS FOR THE IC

Three separate surveys in the mid 1980s, one of industry ICs, a second of Army ICs, and a third of government ICs, asked ICs to identify the major problems they faced. In each of the surveys, the most frequently identified problem was that the

demand for services exceeded the IC's capacity to provide the requested services. As the role of the IC expands to include support for the IMA disciplines, expectations for the IC will increase. This section provides two strategies for managing increased expectations.

5.3.1.1 Clearly State the IC's Services

All of the center's services should be directly related to its mission. As mentioned in Section 5.1.2, the IC should clearly define the services which are appropriate for the IC's mission and those which are not. Written information about the services should be readily available to all users. The purpose of this effort is to establish boundaries for the IC's services so that the center can inform the user when his request is outside the scope of the IC's mission.

As an extension of this concept, the IC may want to establish a list of supported products and to describe the level of support it provides for each product. Using this approach, the IC provides assistance for the items on the supported products list while support is not guaranteed for products not on the list.

5.3.1.2 Determine Alternative Sources of Support

When a user requests assistance for a problem which is beyond the scope of the IC, the center should provide suggestions for alternative sources of support. The user may be referred to the CPO, local colleges, or adult education programs for

training, for example. User groups, product hotlines, or "super users" may be sources for technical support.

5.3.2 MAINTAIN A POSITIVE IMAGE OF THE IC

A positive image of the IC is difficult to build and easy to tear down. Users are likely to remember the negative and take for granted the positive. Three methods for maintaining a positive reputation for the IC are described in this section.

5.3.2.1 Attitude Toward Users

In a 1988 issue Boardroom Reports described a survey taken to determine why customers stop patronizing a business establishment. While price (ten percent) and quality (13 percent) of the product or service accounted for some business loss, the most significant reason (68 percent) for loss of business was the attitude of the employee toward the customer. The IC may have a well qualified staff and outstanding hardware and software resources, but most of the time it is the attitude of the staff that will make the difference in the level of user satisfaction.

ICs were established as service organizations with the purpose of meeting the information technology needs of the end-user community. However, ICs sometimes mistakenly see themselves as supporting technology instead of people. This emphasis must be reversed. The user's information need is paramount; the technology is merely the tool by which that need is met. One Army IC reminds its staff of the importance of the user through a

sign that states, "Users are not an interruption in our work--they are the purpose of it."

There are times when the IC cannot meet the user's need. The request may be outside the scope of the IC's mission, or IC may not be able to solve the problem as quickly as the user wants because of other priorities. To prevent the user from feeling that the IC has arbitrarily decided his need is not important, the IC should provide an explanation to the user when his request is denied.

5.3.2.2 Maintain Credibility By Keeping Promises

The IC must ensure that it can fulfill the promises it makes to the user community if it wants to maintain a positive image. As much as the IC would like to announce through a major publicity effort its decision to add new service offerings, it is wise to start by offering the new service on a limited basis for a trial period. It is better to be able to expand the service to other users than to fail to meet the expectations created by the IC through widespread publicity in the user community. For example, if the IC advertises that it will help any user in the preparation of his IMP initiative, then the IC must be prepared to help every user requesting this service. Initially it is better to limit the service in some way until the procedures are tested and the volume of interest is determined. In this example, the service could be limited to one IMA discipline or by low-key publicity until the IC is sure it can meet user demand for the service.

5.3.2.3 Publicize Success Stories

In addition to operating the IC as a service organization and fulfilling the promises made to the user community, positive publicity will help maintain a favorable image of the IC. Success stories can be described in articles in the IC newsletter and the post newspaper. These articles will be more persuasive if they are written by the user. Users should also be encouraged to tell others--both supervisors and colleagues--about their experience with the IC. A satisfied user is the most convincing publicity the IC can have.

5.3.3 OPERATING THE IC IN AN EVER-CHANGING ENVIRONMENT

One of the greatest challenges facing IC managers is that the IC operates in an ever changing environment. Users become more sophisticated and require greater in-depth assistance. New versions of software packages are released and training materials must be updated. And additional discipline areas need to be integrated into the IC.

Section 3.3.2 focused on the IC's role in introducing change into the organization. The same principles of change management reviewed in that section are applicable to managing change within the IC organization. Four tactics to lessen the impact of change in the IC are described below. First, the IC staff should accept change as inevitable. Second, the IC should keep informed about new developments in information technology so that the staff is not surprised by changes in the technology. Each staff member

can be responsible for reading one publication on a regular basis and reporting new developments in information technology at staff meetings. A third tactic might be to provide service offerings with flexible formats. For example, written training materials can be prepared with generic sections which will not change often and specific sections that will change with each new software release. Finally, the IC should re-evaluate its service offerings approximately every six months to ensure that the needs of the user community are being met.

5.3.4 MANAGING END-USER EFFORTS

Under the integrated IMA IC the IC has increased responsibilities in the management of end-users' utilization of information technology. In order to promote the successful use of information technology, the IC needs to make end-users aware of their data and security responsibilities. In addition, to utilize its limited resources effectively, the IC needs to establish the user's responsibilities in relationship to the IC.

5.3.4.1 User's Data and Security Responsibilities

Use of computer and communication-based information technology in the performance of one's job is relatively new in the workplace. As part of its role in managing end-user efforts, the IC needs to inform managers of end-users and the end-users themselves of their data and security management responsibilities. Issues such as data integrity, data security, documentation, and backup and recovery procedures need to be

addressed. In addition, supervisors may need advice on the management of knowledge workers who are developing computer applications.

5.3.4.2 User's Responsibilities Toward the IC

In order to manage its resources effectively, the IC also needs to make clear the responsibilities of users who are utilizing the IC. The IC may want to develop several check lists which the users complete before contacting the IC for assistance. The hardware check list would include questions such as, "Is the printer cable firmly connected to both the computer and the printer?" The software check list might ask the user to make sure the diskette is entered in the drive right-side up. There might be an extensive list of questions if the user wants to develop a software application. The purpose of these check lists is to promote user self-sufficiency and to reduce the number of "house calls" made by the IC staff.

CHAPTER 6
AUTOMATION

This chapter focuses on the IMA discipline of automation. In this chapter the discipline of automation is defined, current Army policy is summarized, current directions in automation are discussed, and suggestions are provided for the IC's role in supporting users of automation technology.

6.1 DEFINITION OF AUTOMATION

The glossary of AR 25-1 provides the following definition of automation:

> Conversion of a procedure, a process, or equipment to automatic operation.

The field of automation traditionally includes computers--micros, minis, and mainframes--and the associated programs, software, and applications that run on these systems. Frequently peripheral devices which are used to provide computer input or receive output (e.g., modems, printers) are included in the definition of automation.

6.2 CURRENT AUTOMATION GUIDANCE

This section summarizes current Army automation policy of particular interest to Information Centers. Additional detail is found in AR 25-1.

6.2.1 GENERAL AUTOMATION GUIDANCE

Planning for automated information systems will fully consider the Army goals of standardization, compatibility, and interoperability. Functional requirements will be developed only in response to specific mission needs and will be controlled through the use of approved Information Management Plans (IMPs). Additional information on IMPs is found in Section 2.1.4.

6.2.2 THE ARMY INFORMATION ARCHITECTURE

An information architecture is an information management planning tool which defines the configuration of the organization's data/information and information technology systems. Once the architecture is established, new requirements must be satisfied in a way that is compatible with the architecture. The Army Information Architecture (AIA) provides the structure for all aspects the Army's Information Management Program. It is the goal of the AIA to integrate all of the information requirements of the strategic, theater/tactical, and sustaining base environments into an interoperable information architecture.

6.2.3 SOFTWARE MANAGEMENT POLICY

Application software will be acquired utilizing the most cost effective methods. If an application requirement cannot be satisfied with existing software or off-the-shelf commercial software, then the Ada programming language must be used for

applications development. A waiver must be obtained to utilize an alternate programming language.

USAISC has instituted the Army Software Sharing Program. Software developed by Army personnel or under Army contracts will be centrally maintained, updated, and distributed.

6.2.4 COMPUTER BASED INSTRUCTION POLICY

The decision to use computer based instruction (CBI) is based upon the total education or training requirements and the ability of the IC to meet these requirements. Headquarters, Department of Army training functional proponents provide CBI policy and procedures for planning, courseware development, instructional validation, instructional materials and their application. Headquarters, Department of Army, Director for Information Systems Command, Control, Communications, and Computers (DISC4) provides policy and procedures for computer software and hardware, telecommunications, and visual information assets used to support CBI.

6.3 CURRENT DIRECTIONS IN AUTOMATION TECHNOLOGY

This section reviews the current trends in automation technology. The overlapping of automation and telecommunications technology is illustrated in Figure 6-1. The converging of automation and telecommunications technology with visual information, records management, and publications and printing technology is shown in Figures 8-1, 9-1, and 10-1. The

Convergence of Information Technologies:
AUTOMATION AND TELECOMMUNICATIONS

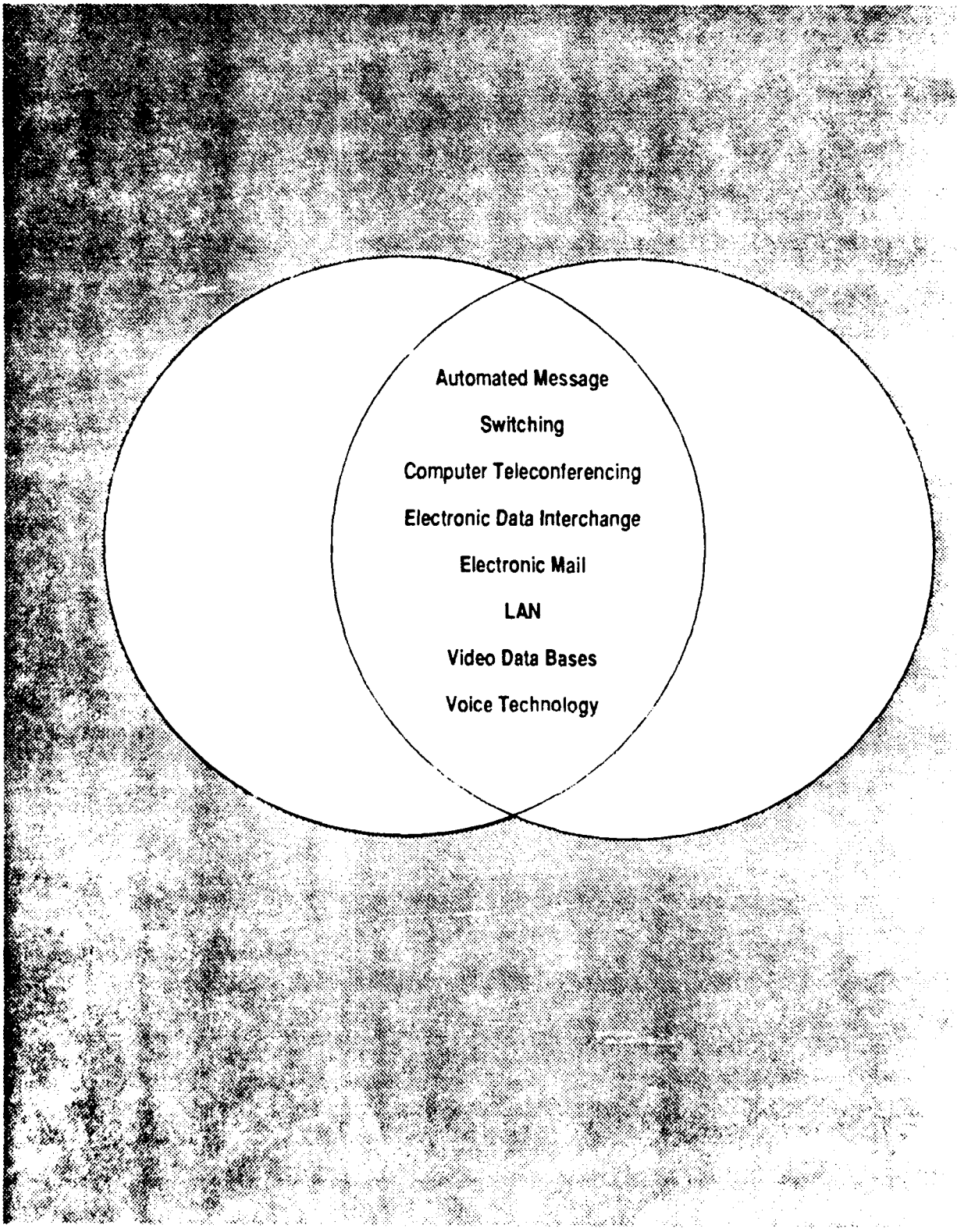


Figure 6-1

overlapping of these technologies is discussed in greater detail in the chapters dedicated to each IMA discipline.

6.3.1 MORE POWERFUL MICROCOMPUTERS

Technological developments in the microcomputer industry have focused on increased processing speed and memory. Processors are currently under development which will triple processing speeds. These powerful microcomputers are designed to serve as network file servers and to support large, complex applications such as statistical analysis and computer-aided design.

6.3.2 PORTABLE MICROCOMPUTERS

Portable microcomputers are becoming smaller and more powerful. Used in the workplace, these machines provide many advantages to personnel frequently on travel and to those who can use the computer to collect information in the field. There are two concerns associated with the use of this technology, however. First, interoperability questions must be addressed when considering procurement of this equipment. Second, accountability measures must also be developed.

6.3.3 DATA BASE MANAGEMENT SYSTEMS AND FOURTH GENERATION LANGUAGES

Data base management systems (DBMS) and Fourth Generation Languages (4GL) are becoming more prevalent. DBMS are designed so that the user can easily retrieve information stored on the computer. 4GL systems automatically generate computer programs

from relatively simple commands issued by the user. It is estimated that a very large percentage of the installation unique applications could be performed given an adequate data base management system and an advanced query capability.

6.3.4 EXPERT/KNOWLEDGE-BASED SYSTEMS

Expert systems, also referred to as knowledge-based systems, are currently being introduced into the workplace. These systems are developed to imitate the specialized knowledge and thought processes of a subject matter expert. Applications of expert systems range from sophisticated consultant's assistants to diagnostic tools. Most expert systems are designed to be used interactively with the user.

When evaluating expert systems development tools, consideration should be given to the issues of interoperability, user interface capabilities, and knowledge handling capabilities. Most of the high-end microcomputer based systems provide a capability to interface with and access files created by data base and spreadsheet files. Mainframe based systems have the capability to access sequential files and data bases, and some provide interfaces to existing application programs.

6.3.5 EXECUTIVE INFORMATION SYSTEMS

Executive information systems (EIS) combine a variety of capabilities including access to specified data, analysis tools, word processing, electronic mail, and graphics in a single system. EIS are designed to provide the executive with timely

and accurate information for decision making. EIS must be designed to provide the executive with the information needed in the format desired. One of the major problems encountered in the development of an EIS is the establishment of a data base sufficiently robust to support the kinds of queries most often posed by the executive user. Two EIS architectures have emerged: stand-alone microcomputer-based systems that download data from a mainframe; and seamless microcomputer-mainframe integration. The stand-alone microcomputer-based system suffers from the problems of data distribution, microcomputer capacity, and maintenance of data concurrency. The seamless microcomputer-mainframe architecture off-loads most of the processing to the microcomputer but keeps all the source data on the mainframe. Data is served to the individual microcomputers as needed. The microcomputer is used for its graphics and user friendly interface (e.g., mouse support, touch screens) and the mainframe for its data base, computational capability, and system-wide integrity.

6.3.6 COMPUTER-AIDED SOFTWARE ENGINEERING

Computer-aided software engineering (CASE) is based upon the structured programming approach where applications are developed with modules consisting of independent, re-usable blocks of code. Each block performs a specific function. CASE tools automate the software development process. There are two major categories of CASE tools. The first, front-end CASE, automates the software analysis and design process. The second category is back-end CASE. Back-end tools automate code generation. Developing in a CASE environment reduces the number of people necessary to

produce software, speeds production, and decreases errors. Dramatic increases in productivity have been hindered because front-end tools do not always integrate with back-end tools.

Computer-Integrated Software Engineering (CISE) represents the next evolution. In the CISE approach, the output of any one computer-aided task will be available to all other tasks in the process, providing consistency and reducing the learning process within a project team.

6.3.7 VOICE RECOGNITION

Voice recognition systems, also termed direct voice input systems, allow the user to use his voice as the computer input instead of a keyboard or other input device. Today's voice input systems do not allow the speaker to use a continuous conversational mode. These systems are further limited because they must learn each individual's voice. Voice input systems often have small vocabularies as well. When this technology is perfected, these limitations are expected to diminish.

6.4 INTEGRATING SUPPORT FOR AUTOMATION IN THE IC

Although some Army ICs have their roots in telecommunications support, most Information Centers started as support organizations for end-users of computer technology. Thus, most Army ICs are already providing automation support. The Information Center Planning and Implementation Guide addresses automation support, specifically microcomputer support, in detail. This section lists end-user support functions

currently being performed by the automation area which could be integrated into the IC.

6.4.1 INFORMATION CONTROL LOG

An automation function that the IC could support is the maintenance of an information control log. This log identifies the information received for batch processing, the operation requested, day and time received, day and time due, and volume of input and output.

6.4.2 AUTHORIZED USERS

The IC can provide end-user support of automation by maintaining records of authorized recipients of data processing products, and verifying identities prior to release of the material. In addition, the IC could prepare documentation to control the transmission of automation products to recipients outside of the organization.

6.4.3 PASSWORDS AND IDs

As the user's central point-of-contact for automation, the IC can administer user IDs and passwords for access to the mainframe through use of time sharing (dumb terminals) and/or micro-mainframe links. In conjunction with Data Administration, the IC can assist users in obtaining proper access privileges to mainframe data bases.

6.4.4 UPLOAD AND DOWNLOAD REQUESTS

The IC can provide assistance to end-users who want to request uploads and/or downloads of data from the mainframe data bases.

6.4.5 END-USER MANAGEMENT TRAINING

Use of microcomputer technology is prevalent throughout the Army, and most ICs provide training in the use of this technology. However, little training is provided to the supervisors of these end-users on data management responsibilities. Because the supervisors often do not have an ADP background, issues such as data integrity, data security, documentation, and backup and recovery procedures are not addressed. As a result, inaccurate data and data loss are common, wasting valuable resources. Those individuals who supervise end-users need to be aware that they must provide responsible management of the Army's information and information technology assets used by their personnel. (See also Section 5.3.4.1)

CHAPTER 7
TELECOMMUNICATIONS

This chapter focuses on the IMA discipline of telecommunications. In this chapter the discipline of telecommunications is defined, current Army guidance is summarized, current directions in telecommunications technology are discussed, and suggestions are provided for the IC's role in supporting users of telecommunications technology.

7.1 DEFINITION OF TELECOMMUNICATIONS

The glossary of AR 25-1 defines telecommunications as:

> Any transmission, emission, or reception of signs, signals, writings, images, and sounds or information of any nature by wire, radio, visual, or other electromagnetic systems.

Simply stated, telecommunications is the electronic transfer of data or information from one place to another. In today's workplace telecommunications provides the link between many of the input, output, processing, and storage devices of information technology. The use of telecommunications to exchange data and information is increasing.

7.2 CURRENT TELECOMMUNICATIONS GUIDANCE

According to AR 25-1, the following activities are included in the discipline of telecommunications: telecommunications centers, telephone systems, local area networks, interfaces between networks, message traffic, and facsimile transmissions. All voice, video, and computer communications are included. The

discipline also requires the associated security measures. This section summarizes current Army telecommunications guidance of particular interest to Information Centers. Specific guidance can be found in the following ARs: 25-1, 25-6, 530-2, and 530-3.

7.2.1 GENERAL TELECOMMUNICATIONS GUIDANCE

The purpose of telecommunications within the Army is to provide the means to collect and disseminate information efficiently. It is a goal of the Army to support more applications with fewer systems. Ideally, telecommunications systems should support both voice and data communications. Telecommunications systems should facilitate interoperability, that is, they should allow the electronic exchange of data and information.

The Defense Communications System (DCS) includes the following networks: AUTODIN, AUTOVON, AUTOSEVOCOM (transitioning to DSN), DCTN, and DDN. These networks are to be used unless they cannot meet validated user requirements.

DoD/Open Systems Interface (OSI) standards will be used with the Government Open Systems Interconnect Profile (GOSIP) for data communications requirements.

Telecommunications centers in a single geographical area will be consolidated into a single facility, if cost effective.

7.2.2 TELEPHONE SERVICES

Telephone systems on Army installations are under the operational control of the installation commander. The DOIM acts for the installation commander in the day to day operation of the telephone system including: maintaining records of the numbers and types of telephone equipment in use on the installation; monitoring the use of telephone services including telephone credit cards; and filling requests for changes, additions, and deletions of local telephone services from components of the command and tenant activities.

7.2.3 FACSIMILE EQUIPMENT

Common-user non-secure facsimile (fax) service is generally provided in the telecommunications center. A centrally located user-operated facsimile terminal may be made available as a shared-use facility at locations remote from the telecommunications center. All fax equipment connected to AUTODIN must meet the DCS interface standards. Section 7.3.4 contains an explanation of fax equipment.

7.2.4 DIGITAL INFORMATION TRANSFER

Digital information transfer, also called electronic data interchange, service pertains to information transmitted and received in a form that can be processed by computer. In this process, data is transmitted directly from one computer system to another. Data information transfer requirements are provided by AUTODIN, the Defense Data Network (DDN), and the World Wide

Military Command Control System (WWMCCS). The DDN will be used to provide long-haul data communications services.

7.2.5 ELECTRONIC MAIL

Electronic mail (e-mail) will use DDN for long-haul communications, although e-mail is not part of DDN. E-mail systems connected with DDN must conform to DoD protocols and have the necessary DDN interfaces. The use of e-mail is encouraged because it allows information to be exchanged in a timely and documented manner. A more detailed explanation of e-mail is found in Section 7.3.1. E-mail will become an integral element of the future generation of message traffic. The objectives of the shift to e-mail are summarized below.

E-mail improves efficiency. Use of e-mail will reduce the use of telecommunications centers and facsimile facilities, and shift unclassified traffic from AUTODIN to DDN to take advantage of a more automated and distributed means of communication.

E-mail provides a form of electronic recordkeeping. Use of e-mail will shift the creation, transmission, and storage of correspondence and information from hard-copy to electronic form.

Use of e-mail will provide the user with direct control of a more responsive means of communication than is presently available.

7.3 CURRENT DIRECTIONS IN TELECOMMUNICATIONS TECHNOLOGY

This section describes the current state-of-the-art of some of the telecommunications technology which may be of special interest to Information Centers. In the examples discussed in this section, there is substantial overlap of telecommunications technology and other information technologies. The overlap with automation was illustrated in Figure 6-1. The overlap of telecommunications and automation with the other IMA disciplines is depicted in Figures 8-1, 9-1, and 10-1.

7.3.1 ELECTRONIC MAIL

E-mail typically allows the user to create, send, receive, acknowledge, and annotate correspondence electronically by means of a microcomputer or computer terminal. The major advantage of e-mail over conventional mail is user convenience. The sender can deliver his messages from his desk, and the receiver can read his mail from any compatible system. Currently these systems are limited to textual documents, but in the future most systems will have the ability to transmit any computer-generated output, including spreadsheets and graphics.

Future directions for e-mail include the application of expert systems technology (see Section 6.3.5) to sort messages according to parameters established by the user.

7.3.2 FACSIMILE TECHNOLOGY

Fax equipment electronically transmits graphics, maps, documents, or other printed or hand-prepared material over communications lines. Facsimile boards for microcomputers are now available enabling the user to interface with a remote fax machine or another similarly equipped microcomputer. The user can send text and graphics developed on the microcomputer as well as edit text and graphics received via fax. A veiwfax device is under development which will transmit three dimensional images. Also in the future are plain paper fax machines, color fax machines, and digital transmission.

7.3.3 LOCAL AREA NETWORKS

Local area networks (LANs) link multiple hardware devices and peripherals, enabling users to share data, software, printers, and communications devices. They allow for transparent connectivity between devices and access to multiple applications. LANs are usually limited in their geographic scope to one site but can be connected through gateways to remote computers and networks. LANs are beginning to replace departmental computers. Use of LANs is already widespread in the Army. A number of problems remain, however. Hardware incompatibility may require site-specific engineering during installation. Ensuring data security has also been difficult.

7.3.4 VOICE TECHNOLOGIES

In addition to voice recognition systems (see Section 6.3.7), other voice-based technologies are emerging. Voice mail/messaging converts analog voice signals to digital format for storage on a computer for later retrieval by the recipient. Some voice mail/messaging systems are connected with the organization's telephone system; others operate independently. Eventually both e-mail and voice mail/messaging systems will probably be replaced by systems which will integrate textual and graphic images with voice. Section 7.3.5 describes one such integrated system.

Another voice technology, the automated attendant, has recently become available. The automated attendant answers the phone with a recorded message and then forwards the caller to the desired destination. Some of these systems provide the caller with a menu of options to assist the caller in reaching the right destination. Industry standards for voice technology are in the formative stage.

7.3.5 INTEGRATED SERVICES DIGITAL NETWORK

Integrated services digital network (ISDN) describes a class of networks which integrate digitized voice, computer, facsimile, and video information. The user can both send and receive information using an ISDN network. The goal of this kind of network is to enable the user to meet all of his information needs through one network using a single device. Ultimately the goal is to have a network that has many of the features of

today's telephones, where the user can plug into a wall socket and communicate world-wide with any other device with similar capability. Although ISDN networks can function over simple twisted-pair wiring such as that currently in use for telephones, use of fiber optic cables is needed to handle the anticipated volume of information. Commonly accepted standards for these networks do not yet exist.

7.4 INTEGRATING SUPPORT FOR TELECOMMUNICATIONS IN THE IC

Many Information Centers already provide telecommunications support for users needing data communications. This section lists user support functions currently performed by the telecommunications discipline which could be integrated into the Information Center.

7.4.1 USER REQUESTS FOR TELEPHONE SERVICES

The IC could work with the user to identify his telephone service needs. Additionally the IC could fill requests for changes, additions, and deletions of local telephone services. If the user requires special telephone equipment, the IC could help the user justify his needs for validation by the DOIM.

7.4.2 TELECOMMUNICATIONS PROBLEM ASSISTANCE

The IC may provide assistance to the end-user similar to the assistance currently provided for computer hardware and software problems. Under this service the IC would work with the user to identify and resolve the telecommunications problems the user is

experiencing. This support could be made available through a help desk or help line.

7.4.3 TELECOMMUNICATIONS EQUIPMENT INVENTORY

The IC could maintain the telecommunications equipment and asset inventory, including type of service or equipment and the name and address of the responsible user. This inventory would provide a user profile which would be beneficial to the IC in processing requests for new equipment, or if the IC works with the user to resolve problems with existing equipment.

7.4.4 DDN ASSISTANCE

The IC could assist the user in preparing requests for use or waiver of use of DDN. The IC would provide guidance to users on how to obtain appropriate DDN documents and maintain a library of applicable DDN documents.

7.4.5 E-MAIL USER SUPPORT

The IC could provide a full range of e-mail support. The IC might choose to maintain records of accounts for individuals and offices on the local e-mail system and provide necessary training to authorized users of the system. In addition, the IC could monitor e-mail files to preclude build up of files with invalid or missing address information.

7.4.6 DATA ACCESS

The IC can assist the end-user in becoming self-sufficient in obtaining access to data available on local computers and on

network resources and gateways to information transfer facilities.

7.4.7 ELECTRONIC BULLETIN BOARD

The IC could sponsor a bulletin board which would provide local distribution of unclassified, nonsensitive information/data through installation information networks and office automation equipment. Included in the bulletin board could be the IC newsletter with announcements of training, user group meetings, product tips and suggestions, and an information exchange.

7.4.8 LAN SUPPORT

Now that LANs are commonplace, ICs are working with LAN managers to provide training and assistance in the setup and maintenance of microcomputer and minicomputer networks.

CHAPTER 8
VISUAL INFORMATION

This chapter focuses on the IMA discipline of visual information (VI), previously termed audio-visual support. In this chapter the discipline of VI is defined, current Army policy is summarized, current directions in visual information technology are discussed, and suggestions for the IC's role in supporting users of visual information technology are provided.

8.1 DEFINITION OF VISUAL INFORMATION

The glossary of AR 25-1 provides the following definition of visual information:

> Use of one or more of the various visual media with or without sound. Generally speaking, VI includes still photography, motion picture photography, video or audio recording, graphic arts, visual aids, models, display, visual presentation services, and the processes that support them.

Within the Army, visual information (VI) has traditionally been associated with training support. The IMA discipline of visual information includes the visual information support center, television production facilities, photographic facilities, and teleconferencing. The purpose of the discipline is to capture and communicate visual and aural information necessary to the mission of the organization.

VI media are used to provide information and document events. VI products include manually and computer generated images and sounds such as graphics, photographs, film strips,

video tapes, audio tapes, models, and exhibits. VI products combined into a self-contained, complete presentation comprise a VI production.

8.2 CURRENT VISUAL INFORMATION GUIDANCE

As of the publication of this guide, the most recent policy regarding visual information is found in AR 25-1. Key points of interest to Information Centers are summarized here.

8.2.1 VI SUPPORT CENTER

Specified VI activities are to be combined into one VI Support Center for the installation including: still photography, motion picture, video recording, audio recording, graphic arts, library, maintenance, presentation, and still video. These activities are non-production and documentary in nature. The VI Support Center may be assigned to the DOIM for operational control, staff management, and policy oversight.

8.2.2 VI ACTIVITIES AND TRAINING SUPPORT

The MACOM commander may elect to have the training community continue to operate those VI activities which currently provide support to training support centers. The DOIM will provide staff management and policy oversight to these VI activities which remain under the operational control of the training support center.

8.2.3 TEST AND EVALUATION OF VI TECHNOLOGY

According to Army policy described in AR 25-5, evaluations of commercially available, off-the-shelf VI technology should be coordinated with the Army Visual Information Management Office (AVIMO) to avoid duplication of effort. The AVIMO is responsible for providing DISC4 with VI planning, programming, policy and architecture standards.

8.2.4 CONFERENCING SUPPORT

Conferencing support, including teleconferencing, is a VI activity. Video teleconferencing facilities and the associated technology are part of this VI activity. Teleconferencing technology is described in Section 8.3.1.

8.3 CURRENT DIRECTIONS IN VISUAL INFORMATION TECHNOLOGY

This section describes some of the current trends in visual information technology. As with the other discipline areas, visual information technology incorporates automation and communications technology. The overlap of these information technologies is shown in Figure 8-1.

8.3.1 TELECONFERENCING

Teleconferencing is the dominant form of conferencing today. Teleconferencing utilizes telecommunications links to connect participants in different physical locations. Teleconferencing was originally conceived as a means for displacing travel costs. In addition, it allows more people to be involved in the

Convergence of Information Technologies

VISUAL INFORMATION, AUTOMATION AND TELECOMMUNICATIONS

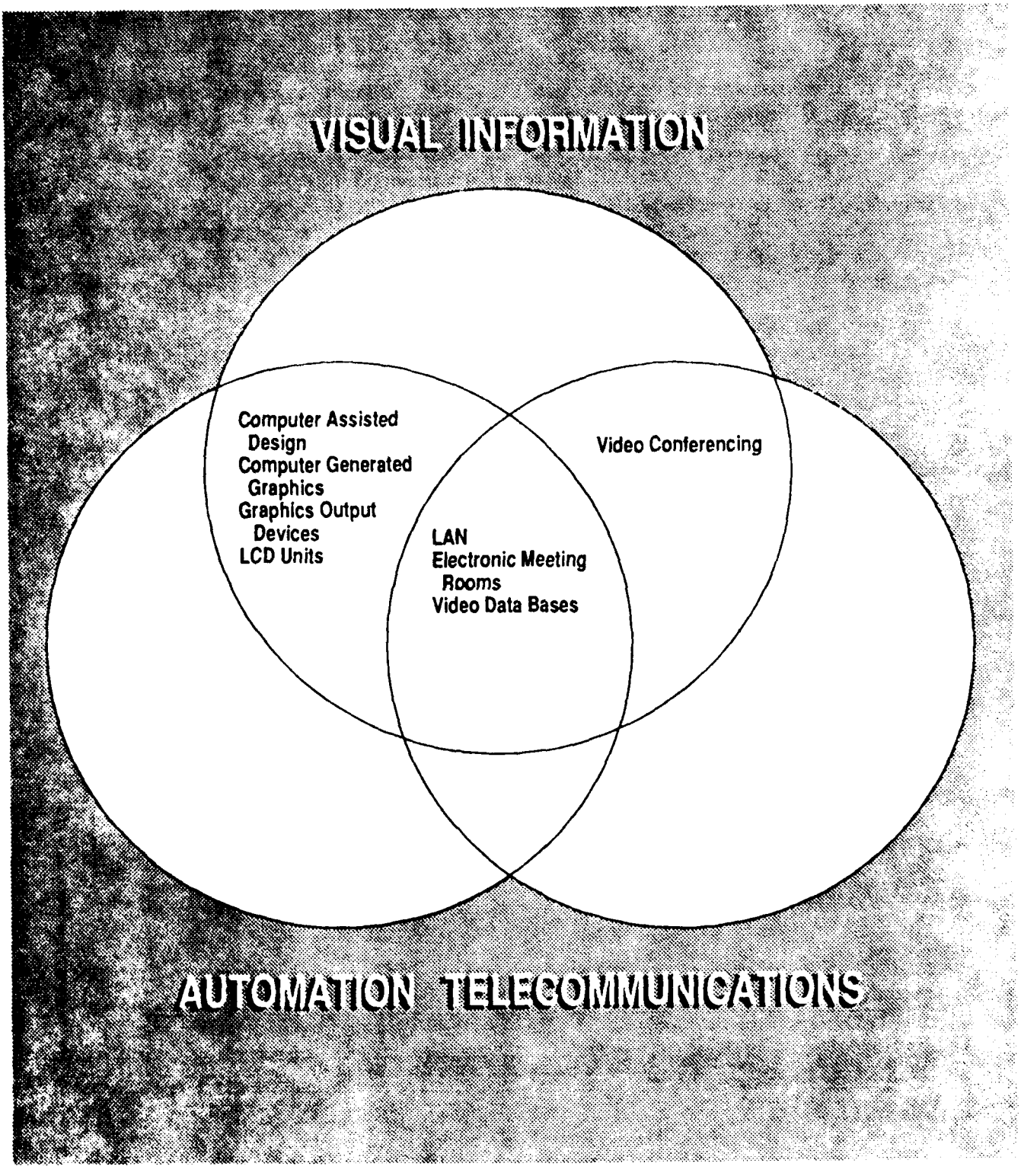


Figure 8-1

conference. Teleconferencing includes audio teleconferencing, video teleconferencing, and computer teleconferencing. Audio teleconferencing connects participants using standard telephones and speaker phones. Audio-graphic teleconferencing adds devices such as electronic blackboards to audio conferencing. In video teleconferencing, television images of participants are an integral part of the teleconference. Capabilities of these systems range from very limited where the video is fixed frame and does not follow the precise motions of the participants, to full motion where the video picture is refreshed at a rate which follows the motions of the conferees. In addition to video teleconferencing rooms, portable roll-about teleconferencing units exist.

A variation of teleconferencing is computer teleconferencing. Computer teleconferencing is the interactive exchange of messages between two or more individuals at different terminals or microcomputers. Computer video teleconferencing systems incorporate a camera and microphone with a microcomputer to allow an individual to video teleconference directly from his desk.

8.3.2 ELECTRONIC MEETING ROOMS

Electronic meeting rooms are another kind of conferencing. These rooms apply information technology to the process of human interaction. The activity is based on networked microcomputers, on which participants input their ideas and respond to the ideas of others without speaking. What one individual types on his

keyboard appears on everyone's screen and also on an electronic chalkboard. Typically in meetings a few individuals dominate the meeting, but in an electronic meeting room all participants have an equal voice in the discussion. These rooms may also incorporate other audio and video equipment.

8.3.3 VIDEO DATA BASES

Using a video data base, or videotex, the user selects from a menu of options the specific information he is interested in. Video data bases are distinguished from traditional data bases in that the information is presented in textual and graphic form. Videotex systems are most frequently used in situations where a large number of geographically dispersed users need access to the same information. Users are connected to the video data base via a remote terminal or microcomputer. Examples of videotex applications include stock prices, news information, and directory assistance. Some videotex systems are interactive; for example a videotex shopping system allows the user to consult a visual catalogue of items for sale and then make the purchase using the system. Potential applications of videotex systems include the distribution of training programs and commonly used reference materials. Although the technology for videotex currently exists, the cost has prohibited widespread implementation of the technology.

8.3.4 COMPUTER GENERATED GRAPHICS

Microcomputer software has enabled the end-user to produce graphics for briefings, reports, and to provide decision support. These graphics have decreased the demand for visuals produced by the VI shop or outside vendors. Those graphics which are prepared by the VI shop can be transferred electronically to the customer.

The graphics capabilities available to the end-user are increasing. Users can manipulate the size of a graphic, rotate its position, and make alterations to the graphic pixel by pixel. Some graphics packages provide a "clip art" library for the user to use as-is or alter. Many graphics packages allow the user to draw images with a mouse type device. Most graphics software packages are designed for a particular purpose--to generate either charts or free-form drawings, for example. Trends for the near future include more on-screen color and additional special effects.

8.3.5 GRAPHICS OUTPUT DEVICES

The quality of the images produced by output devices has increased as has the variety of devices available. This section summarizes some of the current trends in graphics output devices. Color thermal technology now provides low cost, vivid transparency or paper output. Twenty-four pin dot matrix and ink jet printers are replacing nine pin color printers, resulting in higher quality output. Increased dots per inch and color output are under development for laser printers. Film recording devices

for making 35mm slides from computer generated graphics are becoming more common as the price of these devices decreases. In addition to these hard-copy output devices, computer generated graphics can also be presented on-screen using a microcomputer or a projection device attached to the microcomputer. To date most of the development in graphics output devices has focused on quality; future developments will seek to decrease the length of time it takes to produce the output.

8.3.6 COMPUTER AIDED DESIGN/COMPUTER AIDED MANUFACTURE

Computer aided design (CAD) is related to computer generated graphics, discussed above. Using a CAD system an engineer or scientist applies computer modeling, analysis, and simulation to computer generated graphics. CAD systems are most often used to design products to be manufactured. Computer aided manufacture (CAM) systems use computers in the manufacturing process to control machines and automate test procedures. CAD/CAM technology is relatively stable at present.

8.3.7 LIQUID CRYSTAL DISPLAY PROJECTION PANELS

Liquid crystal display (LCD) panels are used with computers and overhead projectors to display images from the computer. The LCD panel is connected with the computer's video output port and rests on the overhead projector in place of a transparency. Because of the current limitations, this technology is used primarily for small, informal presentations. The projected image is not as crisp as a slide image, and the colors are not

identical to those on the computer screen. Monochrome versions are also available. Under development are LCD panels with improved resolution and true color.

8.3.8 ARTIFICIAL INTELLIGENCE APPLIED TO VI

When a computer exhibits the characteristics of human intelligence--such as the ability to reason--the computer is said to have artificial intelligence (AI). One field of AI focuses on expert/knowledge-based systems as described in Section 6.3.4. Another field of AI focuses on visual systems. A computer with visual intelligence would be able to see, to interpret what it sees, and to respond appropriately. One application in this field is a software interface between an optical scanner and a computer. The software enables the microcomputer to read and translate documents with multiple mixed fonts and graphics. Such software uses AI to learn the type styles used in a document and determine if data is text or graphics. (See Section 9.3.2 for a description of optical character recognition and image scanning devices.)

8.4 INTEGRATING SUPPORT FOR VI IN THE IC

This section describes techniques for incorporating support in the IC for users of visual information technology.

8.4.1 CENTRAL LOCATION FOR SPECIALIZED HARDWARE/SOFTWARE

Most end-users have occasional visual information requirements and cannot justify the purchase of specialized graphics software or output devices. In addition, because

graphics are not developed on a regular basis, the user may need assistance using the software or hardware. If graphics software and output devices are located in the IC, these products will be available to everyone on the installation. Users can then schedule appointments with the IC to use the graphics resources.

8.4.2 TRAINING IN BASIC DESIGN PRINCIPLES

Since creating graphics is a new capability for most users, they will need assistance in understanding basic design principles. The IC may want to offer a course on this topic. Since the basic concepts apply equally to graphics and desktop publishing, this one course would be useful to users of both technologies. Such a course demonstrates the maximizing of resources which results from the integration of the IMA disciplines.

8.4.3 SLIDE SAMPLES/TEMPLATES

To encourage a standard format for briefing slides, the IC may want to provide sample slide formats. The IC could also provide the users with electronic templates of logos commonly used on briefing charts. The IC may work with the VI shop to create the templates.

8.4.4 VI USER ASSISTANCE

If support for visual information is integrated into the IC, the goal of the IC should be to expand its needs assessment and

problem solving services to include support of users of visual information technology.

8.4.5 AUDIO VISUAL EQUIPMENT LOAN

Some ICs include a loan service as part of their support of visual information. The IC could make available audio visual equipment such as slide projectors, overhead projectors, and liquid crystal display projection panels.

8.4.6 CONFERENCING

Part of the IC's visual information services may include assisting users with video conferencing equipment. The IC may demonstrate the use of the equipment to conference participants. Some ICs are responsible for the scheduling of their installation's video conferencing facility.

CHAPTER 9
RECORDS MANAGEMENT

The topic of this chapter is the IMA discipline of records management. In this chapter the discipline of records management is defined, current Army policy is summarized, current directions in records management technology are discussed, and suggestions are provided for incorporating support for records management in the IC.

9.1 DEFINITION OF RECORDS MANAGEMENT

The glossary of AR 25-1 provides the following definition for records management:

> The planning, controlling, directing, organizing, training, promoting, and other managerial activities involved with respect to *information* creation, information maintenance and use, and information disposition in order to achieve adequate and proper documentation of the policies and transactions of DA and effective and economical management of DA operations.

Records management is concerned with the creation, use, and preservation of information of importance to the Army and to the United States. These activities are divided into three phases which describe the life cycle of a record. The life cycle begins when a record is created; this is phase one. The second phase in the life cycle of a record includes the storage and retrieval of the record. In the final phase of the life cycle, a record is archived or destroyed.

Historically, records management focused on manual systems for paper-based records. However, as illustrated in Figure 2-1, information may have many physical forms--from magnetic computer media to film to printed documents. Records management applies equally to records that are created and maintained on paper and records that are created and maintained electronically.

9.2 CURRENT RECORDS MANAGEMENT GUIDANCE

As described in AR 25-1, records management includes twelve major subprograms: Army recordkeeping systems management; official mail and distribution management; correspondence management; rulemaking; Freedom of Information Act program management; Privacy Act program management; Management Information Control Office; vital records; terminology, abbreviations, and brevity code management; special records management programs; archivist of the Army; and Joint Visual Information Records Centers. This section summarizes general records management guidance and the Army recordkeeping systems management subprogram.

9.2.1 GENERAL RECORDS MANAGEMENT GUIDANCE

The objective of records management closely parallels the objective of the IMA. The purpose of records management is to ensure that information in a usable form is available when needed. An additional objective of records management is to document the Army's official business.

Records management in the Army should be implemented so that:

- The minimum essential records are created;
- The most efficient, economical, and technologically advanced methods are used to create records;
- Advanced technology is used to provide expeditious and accurate distribution of information at a minimum cost;
- Alternative information technology is used for storage, retrieval, and use of records if it is cost effective and if it meets legal and archival requirements;
- The rights of Army are protected; and
- Established records management life cycle practices are followed.

9.2.2 ARMY RECORDKEEPING SYSTEMS MANAGEMENT

Army recordkeeping systems management includes management of both electronic and manual recordkeeping systems.

AR 25-400-2, the Modern Army Record Keeping System (MARKS) provides guidance on the implementation of the records management life cycle in the Army, including the establishment and operation of records holding areas. The MARKS Automated Filing and Finding Aid (MAFFA) is the electronic version of MARKS. The user may search the MAFFA data base electronically instead of searching the hard-copy regulation.

9.3 CURRENT DIRECTIONS IN RECORDS MANAGEMENT TECHNOLOGY

This section describes some of the current trends in records management technology. The examples of records management technology described here demonstrate the convergence of this discipline with automation and telecommunications technologies as illustrated in Figure 9-1.

9.3.1 OPTICAL STORAGE MEDIA

Optical storage media is of particular interest to the disciplines of automation and records management. These devices provide large amounts of on-line storage. However, it should be noted that optical storage devices are not currently an approved media for permanent storage of official records. Most systems available today are either Write Once, Read Many (WORM) or Compact Disk, Read Only Memory (CD ROM). Data stored on these disks cannot be altered. Erasable optical disk technology will provide an alternative for those who require the ability to alter data stored on mass storage devices.

A WORM optical drive allows the end-user to write data permanently onto a disk coated with a special reflective material. Once the data is stored on the disk, it can be retrieved as often as necessary, but it cannot be erased or changed. This makes WORM storage ideal for back-up and archiving applications that require that files never be altered. Currently, there are no standards for WORM disks, and each

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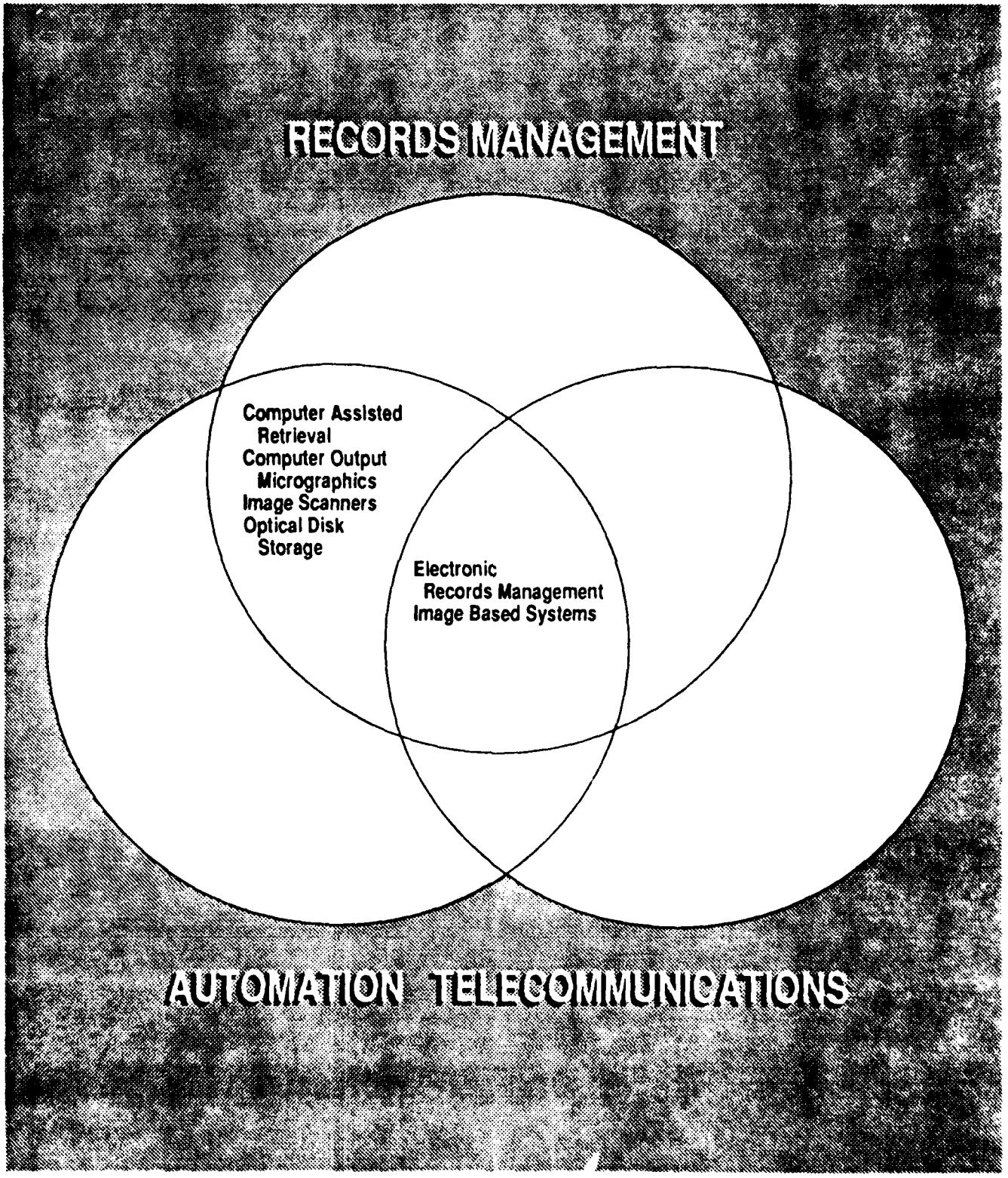

Figure 9-1

manufacturer uses a different cartridge size and/or a different format.

As the ROM in its name suggests, users can read data from but not write to a CD ROM. CD ROM disks encode data much as WORM disks do, as a series of tiny pits in the disk surface; however, the machinery used to burn those bits into the platter of the CD ROM is much more expensive, partly because it works faster. For this reason, CD ROM disks are "mastered" at a central location and are used to distribute large amounts of data that will not require frequent updating. Unlike WORM drives, all CD ROM drives use the same disk size and format, and any disk can be read by any other manufacturer's drive.

Optical drives that combine the immense storage capacities of WORM and CD ROM systems but allow the user to alter and erase data freely are now appearing on the market. Erasable optical systems are based upon a hybrid technology known as magnetic optical (MO). An MO drive takes advantage of the fact that the magnetic properties of any material can be changed more readily when the substance is heated to a specified temperature. The material used to coat the surface of an MO disk is chosen partially because it shows this magnetic response at the relatively low temperature a small laser can generate, and also because it reflects laser rays differently depending upon how much it is magnetized.

9.3.2 OPTICAL CHARACTER RECOGNITION AND IMAGE SCANNERS

Optical character recognition (OCR) devices scan text and convert the scanned text into digital format. Currently OCRs are incorporating the capability to scan images. Previously this action was performed with a separate device, an image scanner. The scanned information may then be stored as-is on magnetic or optical media or altered electronically. The OCR software can reside either in the scanner or in the computer. This technology is of interest to word processors and graphics artists since it eliminates the re-creation of the information. It is also of interest to records managers as a means to convert printed records to digital form for electronic storage and retrieval. At present the devices can only scan a limited number of type styles. Under development are scanners which can read an unlimited range of type styles, intermixed type styles, as well as handwritten documents. As discussed in section 8.3.8, the application of artificial intelligence to OCRs will greatly increase their utility. OCR and image scanning technology is relatively new, and there is little standardization between vendors in the format of the digital record created. Interoperability requirements must be considered when contemplating procurement of such a system.

9.3.3 IMAGE-BASED SYSTEMS

Image-based systems electronically capture, store, index, and/or retrieve records. Optical disks, as described in section 9.3.1, are one application of image-based systems. Micrographic

image-based systems are more commonly used than optical disks in records management today. Micrographics includes both the reduction of a document on film and the devices used to store, retrieve, and display the information on film.

Two additional image-based systems are currently available: computer output microfilm (COM) and computer-assisted retrieval (CAR). COM systems print the human-readable form of computer produced digital data directly on film. No intermediate paper copy is created; however, COM readers often include a photocopier to provide hard copy output of selected pages. COM is faster and less expensive than paper output and takes less space.

CAR uses computer technology to index the information stored in microform on film. Some of these systems allow the index to be created at the same time the document is filmed. CAR systems are often used in conjunction with a jukebox. A jukebox automatically selects the data requested by the user from optical disks and microforms scanners which are interfaced to the computer. Typically with CAR the user can search for information based on a date, a subject, or a person's name. When the information is found, it is displayed on the user's monitor.

An integrated document processor combines in one physical unit all of the hardware and software needed for document processing and image management. Included in the system may be: an automatic document feeder with an OCR; a scanner to convert images recorded in microform on film to digital form; a central processing unit; a jukebox; a hard drive; floppy disk drives;

optical storage drives; a monitor; a laser printer; and communications hardware and software.

9.3.4 ELECTRONIC RECORDS MANAGEMENT

Terms such as "electronic records management," "automated records management," and "records disposition control systems" are in use today. Commonly accepted definitions of these terms do not exist; the terms are often used interchangeably. These terms usually refer to a combination of a computer, software, and a mass storage device such as an optical disk. These systems focus on the storage and retrieval phase of a record's life cycle, providing enhanced information locator capabilities. Ultimately, these systems will also provide for electronic disposition of records in the Federal Records Center. The National Archives and Records Administration is currently studying system interface standards and protocols for this electronic disposition.

9.4 INTEGRATING SUPPORT FOR RECORDS MANAGEMENT IN THE IC

This section provides some suggestions for how support for the discipline of records management can be integrated into the Information Center.

9.4.1 CENTRALIZED OCR

Because OCR and image scanning devices are still relatively expensive and are required infrequently for most groups within the organization, purchase is hard to justify. However, if

these devices are centrally located in the IC, then they are accessible to the entire user community. Users can schedule appointments with the IC for the use of this equipment and receive assistance in operating the scanning devices.

9.4.2 USER ASSISTANCE FOR RECORDS MANAGEMENT

The IC may want to incorporate user assistance for records management issues in the IC. For example, the IC can advise the user on how to use MARKS, how to obtain records from the records holding area, how to use correspondence formats, or how to apply records life cycle management.

9.4.3 RECORDS MANAGEMENT AND ELECTRONIC RECORDS

The application of records management principles to records created electronically illustrates the integration of these two disciplines. As the proportion of records created electronically increases, the IC may want to make users aware that records management guidance also applies to these electronic records. Articles in the IC newsletter, discussion in user group meetings, and notices on electronic and traditional bulletin boards will promote user awareness.

9.4.4 MARKS TRAINING

Depending on how the records management program is integrated in the DOIM, it may be appropriate for the IC to integrate MARKS training in its training program. At the minimum the IC can advertise the availability of MARKS training via the same means the IC announces other training offerings.

CHAPTER 10
PUBLICATIONS AND PRINTING

This chapter focuses on the IMA discipline of publications and printing. In this chapter the discipline of publications and printing is defined, current Army policy is summarized, current directions in publications and printing technology are discussed, and suggestions are provided for the IC's role in supporting users of publications and printing information technology.

10.1 DEFINITION OF PUBLICATIONS AND PRINTING

The glossary of AR 25-1 provides the following definition of publications:

> Items of information that are printed or reproduced, whether mechanically or electronically, for distribution or dissemination usually to a predetermined audience. Generally, they are directives, books, pamphlets, posters, forms, manuals, brochures, magazines, and newspapers produced in any media by or for the Army.

The same glossary defines printing as:

> The process of composition, platemaking, presswork, and binding, including micropublishing, for the production of publications.

Publications and printing are closely related; in fact their definitions overlap. Printing is sometimes considered a subprogram of publications, since the printing process yields one form of publication. Forms management and office copier management are also included in the IMA discipline of publications and printing.

10.2 CURRENT PUBLISHING AND PRINTING GUIDANCE

At the time this guide was developed, AR 25-1 provided the most recent policy regarding publications and printing. AR 25-30, the Army Integrated Publishing and Printing Program provides more specific guidance. This discipline includes all publications regardless of the media on which the publication is prepared and distributed. The use of electronic publishing is encouraged where cost efficient. Electronic staffing to authenticate publications is current practice in the Army.

The Army Integrated Publishing and Printing Program includes five major subprograms. The Army Publications Management Program provides guidance for the publishing of Army publications. The Army Printing Program includes departmental, Army-wide printing and field printing for command and local use. The Forms Management Program applies to all Army forms whether used Army-wide or locally. The Periodicals and Similar Nonrecurring Publications Review Program specifies a review and approval process for these publications. The purpose of the Readability Program is to ensure that Army publications are easy to read and understand.

10.3 CURRENT DIRECTIONS IN PUBLICATIONS AND PRINTING TECHNOLOGY

This section describes some of the current trends in publications and printing information technology. As with the other discipline areas, publications and printing information technology often incorporates automation and communications

technology. The overlap of these technologies is shown in Figure 10-1.

10.3.1 DESKTOP PUBLISHING

Desktop publishing systems and the latest versions of the top-of-the-line word processing systems provide the capability to integrate text and graphics electronically into the same document. Most of these systems are microcomputer-based. In desktop publishing, layout and cut and paste functions are performed electronically. Most documents created using desktop publishing systems are sent to laser printers; however, these documents can also be electronically transmitted to phototypesetters. High-quality, professional documents can be created using these systems.

There are several constraints associated with the current state-of-the-art of desktop publishing. No standard exists for instructing printers how to compose the page to be printed. If desktop publishing systems are tied into a microcomputer network or hooked on to the mainframe, then file handling facilities must be provided for the graphics. Interface standards are scarce in this area and there are many incompatibilities. Most of the desktop publishing systems require the faster 80386 based microprocessor. A full-page monitor is ideal for efficient utilization. In addition, many of these systems are very complex and the learning curve is quite steep. Despite these limitations, the desktop publishing market is experiencing considerable growth.

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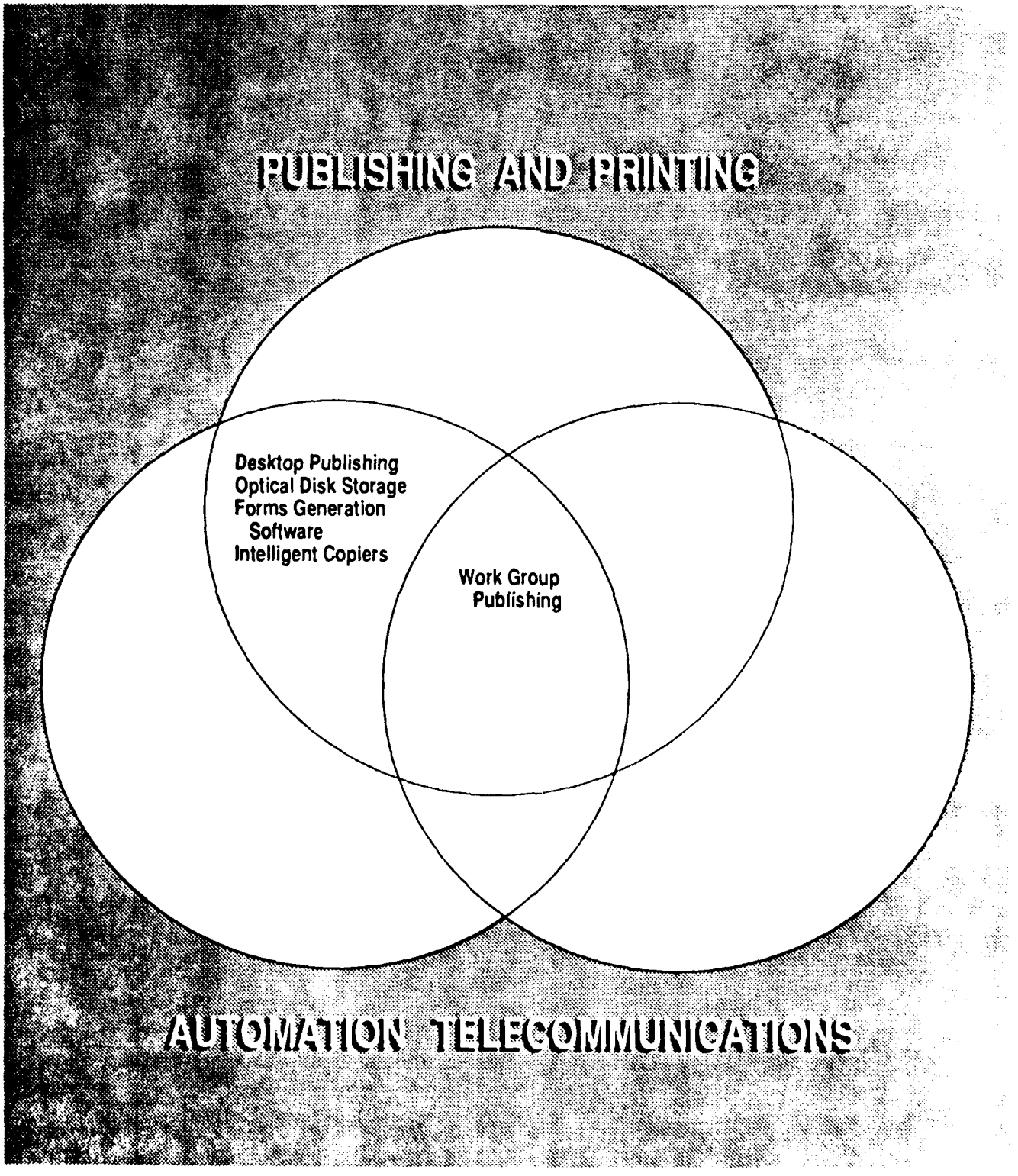

Figure 10-1

And it is likely that new technological developments will overcome these constraints.

Work-group publishing is an extension of desktop publishing. Originally most desktop publishing was performed by one individual on a stand-alone microcomputer. Work-group publishing refers to publishing performed on a LAN. In this environment writers, editors, and graphics artists can manipulate the same electronic document. The finished document can be sent electronically to the designated output device.

10.3.2 INTELLIGENT COPIERS

A copying device which uses a microprocessor to control its functions is called an intelligent copier. These devices perform typical copier functions such as reproducing and collating printed material. In addition, intelligent copiers often include the capability to produce hard copies from digital input. The copier then acts as the output device for the computer. Another feature found in some intelligent copiers is electronic storage. These copiers can store forms in memory, for example, reducing the need for forms storage and distribution activities. Integration of intelligent copiers with facsimile machines is expected in the near future. (See Section 7.3.2 for a description of facsimile technology.)

10.3.3 ELECTRONIC ALTERNATIVES TO PRINTED DOCUMENTS

Some publications are now distributed in machine readable form via floppy or optical disks instead of in traditional hard

copy form. The user can read the electronic document on-line or print the document locally for his own use. Disks require less physical space than paper publications and are usually reproduced more quickly; however the user must have access to equipment which will read the disks. Currently the cost to produce an optical disk exceeds the cost to publish the equivalent paper document. This cost will decrease as the use of optical media becomes more prevalent.

10.3.4 ELECTRONIC FORMS DESIGN SOFTWARE

Forms design software has been on the market for several years. Most of these packages are designed to be used with laser printers. The software includes a wide range of type styles and sizes to allow the user to identically recreate commonly used forms.

10.4 INTEGRATING SUPPORT FOR PUBLICATIONS AND PRINTING IN THE IC

This section describes techniques for incorporating support in the IC for users of publications and printing technology.

10.4.1 TRAINING IN BASIC DESIGN PRINCIPLES

Since creating publications is a new capability for most users, they will need assistance in understanding basic layout and design principles. As described in Section 8.4.2, the IC may want to offer a course on this topic. Since the basic concepts apply equally to graphics and desktop publishing, this one course would be useful to users of both technologies.

10.4.2 PROVIDE STYLE SHEETS FOR DESK-TOP PUBLISHING

To encourage a standard format for publications, the IC may want to provide sample page layouts. The IC could also provide the users with electronic templates of these formats and of logos commonly used in the installation's publications.

10.4.3 PROVIDE TEMPLATES FOR STANDARD FORMS

The IC may want to provide templates of standard forms developed using forms design software (see Section 10.3.4). Users can use the templates on their computers to replace manual entry of information via hand or typewriter. This option also decreases the amount of storage the installation devotes to blank forms.

10.4.4 CENTRAL LOCATION FOR SPECIALIZED HARDWARE/SOFTWARE

Most end-users have occasional publication and printing requirements, and cannot justify the purchase of specialized software or output devices. In addition, because most users do not develop publications on a regular basis, the user may need assistance using the software or hardware. If desktop publishing software, forms design software, and laser printers are located in the IC, these products will be available to everyone on the installation. Users can then schedule appointments to use these resources in the IC.

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